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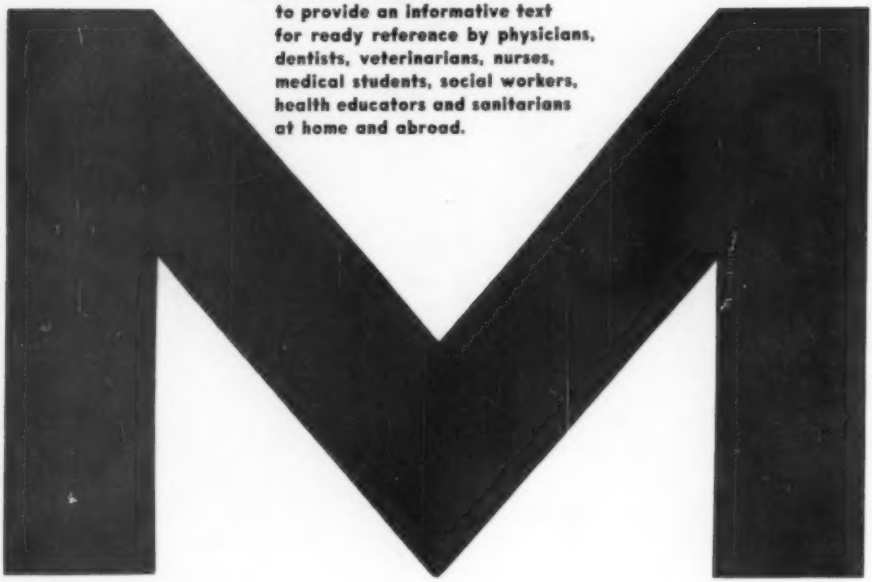

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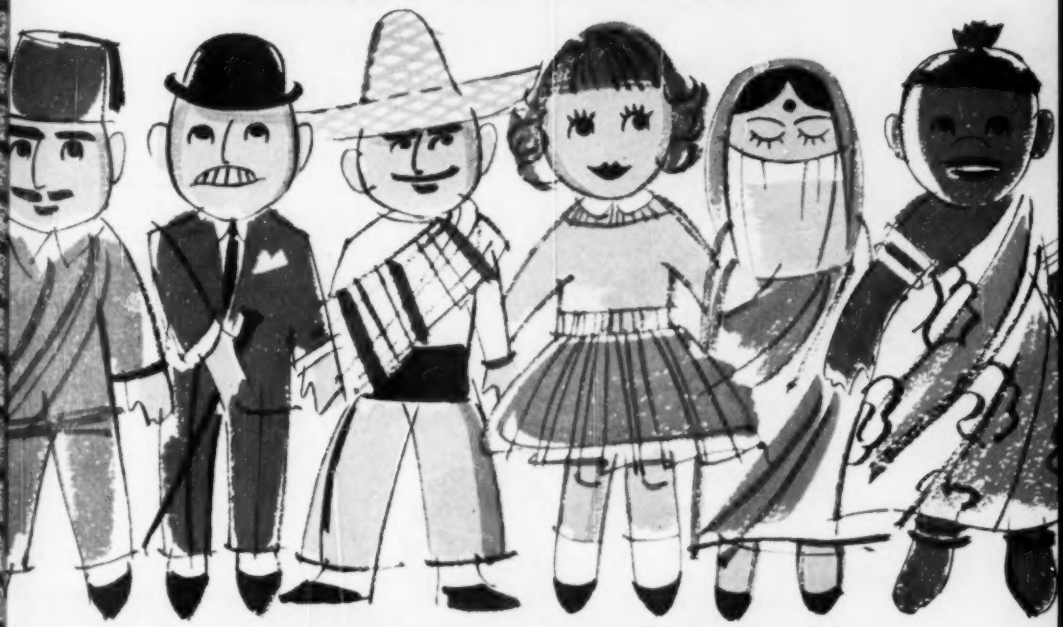

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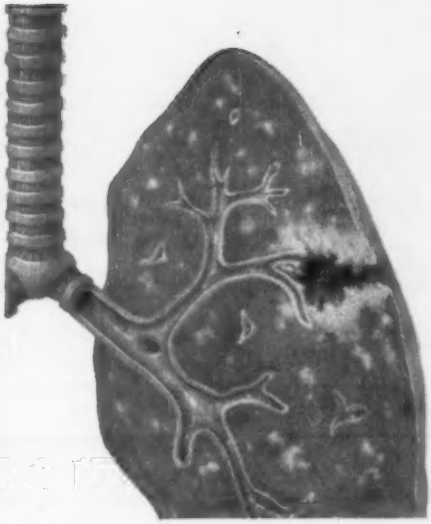

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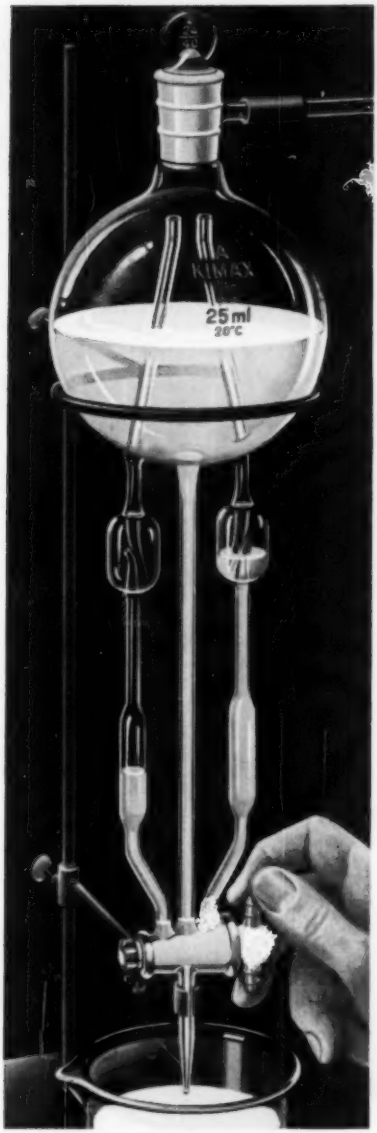

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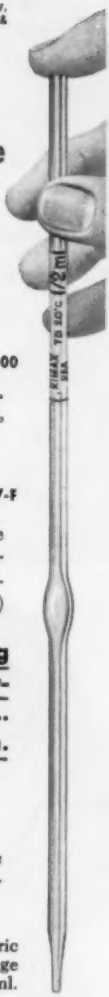

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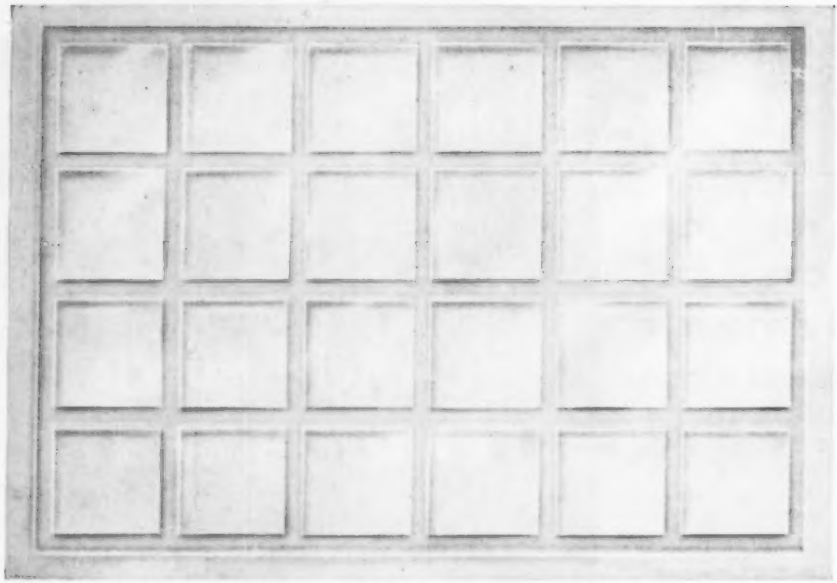

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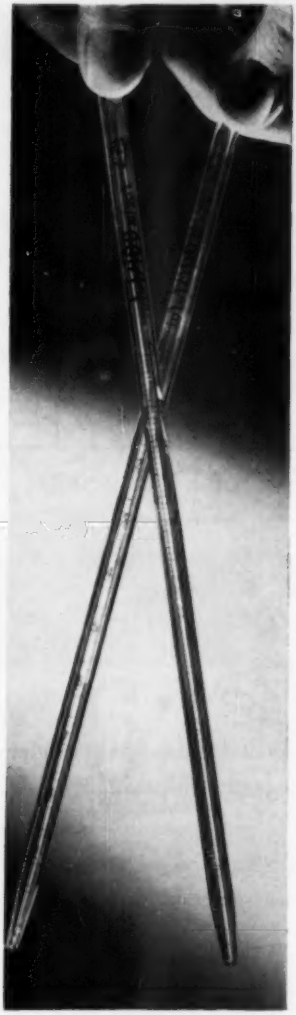

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*Hilleman, M. R., Charney, J., Tytell, A. A., Weihl, C., Cornfeld, D., Ichter, J. T., Riley, H. D., Jr. and Huang, N.: Investigation into the development and clinical testing of a poliomyelitis vaccine containing standardized amounts of purified poliomyelitis virus antigens, 1960 Symposium on Polio Vaccines, Newark, New Jersey, April 20, 1960.

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The vexing problem of air pollution and its effects is examined retrospectively in this study. The authors report on the findings of illness or lack of illness among those who were involved in the acute episode of air pollution in Donora, Pa., in 1948, and endeavor to interpret their findings.

A FOLLOW-UP OF DONORA TEN YEARS AFTER: METHODOLOGY AND FINDINGS

Antonio Ciocco, D.Sc., F.A.P.H.A., and Donovan J. Thompson, Ph.D., F.A.P.H.A.

INTEREST in the health aspects of air pollution continues to mount in this country as well as elsewhere throughout the world. The deleterious effects on health of the acute episodes of air pollution occurring in the Meuse Valley, London, and in Donora, Pa., are well documented,[1-3] if not completely understood. The long range effects on the health of a population exposed intermittently to varying levels of air pollution are far less well documented. Moreover, the problems of measurement and the difficulties encountered in analyses, when one undertakes to elucidate the relations between continued exposure to air-borne pollutants and health in large population groups, suggest that the efforts and experience of many investigators will be required before these relations will be understood. Accepting this point of view it seems appropriate to report the findings of analyses of data from follow-up studies undertaken in Donora and Pittsburgh.

Material and Method

Detailed descriptions of the several surveys providing the data on which this report is based have been published elsewhere.[3-5] A brief summary of the Donora survey will be helpful to an understanding of the material to be presented here.

Following the acute episode of air pollution in Donora in October, 1948, the Public Health Service conducted a community survey on a systematic one-third sample of the households of

Donora listed in the 1947 files of the Tax Assessor of the borough.[3] Data were obtained from a responsible person in the household on all members of the household concerning:

(a) such demographic characteristics as age, sex, occupation, residence;
(b) past experience of specific conditions such as asthma, sinusitis, heart disease, chronic bronchitis, tuberculosis;
(c) the occurrence of symptoms such as cough, nausea, vomiting, headache, and smarting of the eyes during the October episode;
(d) the persistence of these symptoms;
(e) physician and hospital services received for the ailments.

By this survey information was obtained on 4,092 residents of Donora. This group constitutes the part of the 1948 Donora population which was again surveyed early in 1957. By personal interview and mailed questionnaires, slightly more than 99 per cent of the 4,092 persons were traced to 1957. In the follow-up, information was obtained on the 1957 prevalence and 1948-1957 incidence of certain chronic conditions as well as on certain cardiorespiratory symptoms, hospitalization and medical services received, place and cause of death, residence, occupation, smoking history, and other related information. It should be emphasized that the 1957 interviewers were not aware of the responses to health questions which had been made in 1948.

In the 1948 survey of Donora the main question asked was: "Were you affected by the smog of October 28-31?" If the answer was "Yes," the persons involved were placed in the class: "acute illness." Those for whom the answer was "No" were classified under "no acute illness." The information on past experience obtained in 1948 permits additional classifications of the illness status of the study group for 1948. Persons reporting a history of asthma, heart disease, chronic bronchitis, tuberculosis, or sinusitis have been classified under "chronic illness." An "all illness" classification has been defined to include persons reporting "acute illness" and/or "chronic illness" in 1948.

Findings

In Figure 1, mortality during the eight and one-half years following the episode among those who reported "acute illness" in the Public Health Service survey is compared with the mortality among those who did not become ill. The age adjusted cumulative rates* summarize in a single figure the relationship consistently observed for each of five broad age groups investigated. As may be observed from the figure, persons who became acutely ill during the episode differ from those who did not become ill in their subsequent mortality experience. The difference appears in the first year following the episode and is maintained throughout the period of follow-up. There is a suggestion in the figure that the differential rate of mortality in the two groups begins to disappear about midway in the follow-up period.

A similar differentiation of the acute illness and no acute illness groups is possible with respect to indexes of morbidity. Data were obtained in 1957 on heart disease, asthma, high blood pressure, hardening of the arteries, chronic bronchitis, chronic sinus trouble, and kidney trouble. Table 1 includes results which are typical of our findings concerning these diseases.

In the uppermost portion of the table, it will be noted that reported heart

*If P_{ij} is the cumulative age-specific mortality rate to year j for males of age i who reported acute illness and n_i the number of males in age group i in the total 1948 sample, the age adjusted cumulative rate to year j for acutely ill males has been computed as $\Sigma P_{ij} n_i / \Sigma n_i$ with the summation taken over the five age groups considered. Similarly, the rate for males with no acute illness and both female rates were adjusted to the age distribution of the total male and female samples, respectively.

disease prevalence in 1957 among surviving members of the 1948 study group is higher among those acutely ill in 1948 than for those with no acute illness, with a single exception. A similar relation holds for the 1957 prevalence of one or more of all the chronic conditions about which inquiry was made, as may be noted in the second section of the table. In the third section of Table 1 a summary measure of morbidity has been calculated. This measure combines a number of individual measurements of morbidity each showing, generally, the same contrasting pattern for the "acute illness—no acute illness" categories. From the total study group we have isolated those persons who:

1. died during the intervening eight and one-half years since the episode;
2. reported in 1957 a disablement, one or more of the chronic diseases, and/or one or more of the symptoms about which inquiry was made, and/or;
3. are currently under a physician's care for any reason.

These persons are labeled Type S persons, and Table 1 shows the number of such persons per 1,000 population by age, sex, and illness status during the episode. In each age-sex category the ill group contains a higher proportion of Type S persons than the not ill group. If the severity of the acute illness (numbers in parentheses) is taken into consideration the differences, with one exception, are much larger.

Finally, at the bottom of the table we have included the incidence of reported heart disease during the period 1948-1957. In calculating the incidence, the denominator includes only those persons who did not report heart disease in 1948, while the numerator is the sum of those persons who died during the interval from heart disease and those persons alive in 1957 who reported the disease. Without exception

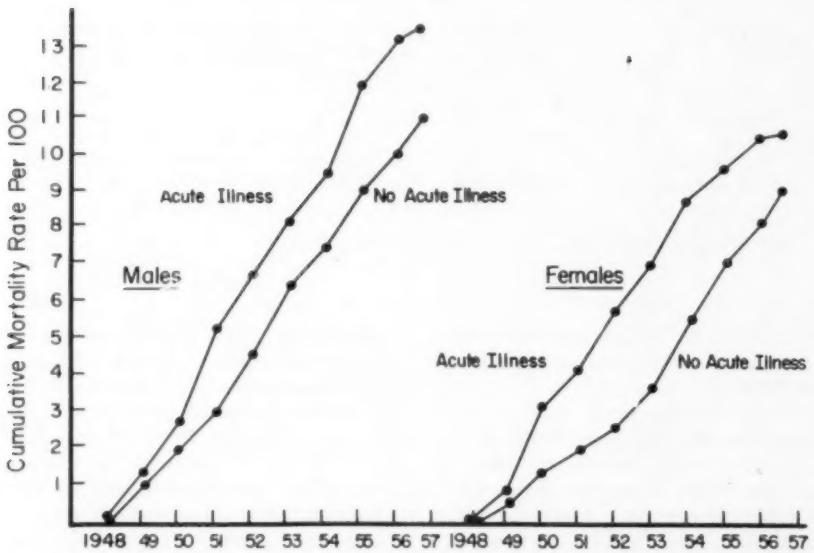

Figure 1—Age-Adjusted Cumulative Mortality Rates for Persons 20 Years of Age or Older; Donora, 1948-1957

Table 1—Morbidity per 1,000 Population from Specified Conditions Classified by Age, Sex, and Illness Status During the 1948 Episode; Donora, Pa.

Age in 1948 (years)	Male		Female	
	Acute Illness	No Acute Illness	Acute Illness	No Acute Illness
	Number of persons reporting heart disease in 1957 per 1,000			
Under 20	15	—	23	7
20-34	19	11	5	10
35-49	31	17	72	56
50-64	110	49	93	72
65 and over	86	33	156	143
	Number of persons reporting one or more of the conditions, heart disease, asthma, high blood pressure, hardening of the arteries, chronic bronchitis, chronic sinus trouble, or kidney trouble, in 1957, per 1,000			
Under 20	96	47	108	57
20-34	135	100	168	82
35-49	151	140	275	212
50-64	238	195	393	312
65 and over	343	133	467	469
	Number of Type S persons per 1,000*			
Under 20	200 (636)†	136	345 (714)	168
20-34	351 (294)	285	453 (529)	338
35-49	430 (696)	347	597 (639)	503
50 and over	707 (833)	643	772 (892)	729
	Number of persons not reporting heart disease in 1948 who have since died from this cause or report heart disease in 1957, per 1,000			
Under 20	15	—	16	10
20-34	19	11	10	10
35-49	40	23	50	39
50-64	139	128	122	119
65 and over	373	172	259	354

* See text for definition.
† Rate per 1,000 for those whose acute illness was classified as severe.

the acutely ill persons have rates equal to or greater than those not acutely ill in 1948.

From the foregoing findings it is clear that the subsequent health of persons who became acutely ill during the episode differs from the group which did not become ill. However, before these facts are hastily interpreted a more searching analysis is required.

The U. S. Public Health Service analysis of 1949 pointed out that a higher proportion of persons with prior cardiorespiratory illness became acutely ill during the episode than persons with no prior chronic illness of this kind. In Table 2 the mortality is analyzed taking into consideration both the prior chronic illness about which a direct query was made in 1948 and the acute response to the episode.

There is not complete consistency with-

in each age-sex subdivision of Table 2, but in general the rates for persons with acute illness only, line (b), are only slightly higher than those with neither acute or chronic illness, line (a). Furthermore, the persons reporting a prior history of chronic illness with or without acute illness during the episode have had the highest subsequent mortality, lines (c) and (d).

Although the numbers on which these rates are based are in some instances quite small, the conclusion seems warranted that the previously noted differences in mortality between the acutely ill and the not acutely ill are sharply reduced if the comparison is limited to those persons reporting no prior chronic illness in 1948. It should be noted, however, that in the age groups 20-49, among both males and females who reported chronic illness in 1948, those who became acutely ill during the episode have had a higher mortality than those who were not acutely ill, lines (c) and (d).

The causes of death in the several illness groups are also of interest with respect to possible interpretations of previous findings. Death certificate information was obtained for 290 of the 314 deaths occurring in the study population.

Table 3 presents the observed and expected deaths from specific causes among persons in the specified sickness classes. In calculating the expected mortality from specific causes of death, we applied to persons in each age group who reported a stated illness in 1948 the appropriate cause mortality rate of the total sample. Since the numbers become small the causes of death were

Table 2—Mortality Rates per 1,000 Population, Donora, 1948-1957, by Illness Status in 1948, Age and Sex

Age (years)	In 1948 Illness Reported	Males		Females	
		Number	Mortality Rate	Number	Mortality Rate
20-34	(a) None	278	7	286	7
	(b) No chronic—acute	134	8	167	12
	(c) Chronic—no acute	36	—	44	—
	(d) Chronic—acute	44	114	48	42
	(e) All illness	214	28	259	15
35-49	(a) None	166	30	164	30
	(b) No chronic—acute	169	41	142	42
	(c) Chronic—no acute	21	48	33	61
	(d) Chronic—acute	53	94	58	138
	(e) All illness	243	53	233	69
50-64	(a) None	137	153	129	109
	(b) No chronic—acute	170	171	123	138
	(c) Chronic—no acute	31	323	19	263
	(d) Chronic—acute	68	265	53	245
	(e) All illness	269	212	195	179
65 and over	(a) None	44	455	44	432
	(b) No chronic—acute	55	400	50	480
	(c) Chronic—no acute	19	579	13	538
	(d) Chronic—acute	28	679	21	381
	(e) All illness	102	510	84	464

Table 3—Relationship of Reported Illness to Stated Cause of Deaths in Persons 21 Years of Age and Over, Observed and Expected Deaths; Donora, 1948-1957

Illness Reported in 1948	Sex	Number of Persons	Cause of Death					
			Neoplasms (140-205)*		Cardiovascular (410-456)		Other	
			Observed	Expected	Observed	Expected	Observed	Expected
All illness	M	796	20	19.2	59	51.2	43	41.8
	F	747	17	14.6	44	39.8	28	24.2
Acute illness only	M	509	12	11.7	25	30.3	21	25.2
	F	468	12	8.9	22	24.1	11	14.7
Heart disease	M	46	1	1.7	12	4.9	7	3.8
	F	72	1	1.8	13	5.4	6	3.2
Asthma	M	46	2	1.8	12	5.5	3	4.1
	F	29	0	0.8	4	2.4	1	1.4
Pneumonia and bronchitis	M	177	6	4.4	16	12.1	12	9.7
	F	146	3	3.1	13	8.7	11	5.2
Not ill	M	584	9	9.8	18	25.7	21	22.2
	F	585	7	9.4	20	24.2	11	14.9

* Numbers in parentheses refer to the International List of Causes of Death.

grouped into only three categories: neoplasms, heart disease, and "other." The data show that a higher mortality than expected occurs principally in the case of cardiovascular deaths among persons reported to have had heart disease, asthma, or pneumonia and bronchitis in 1948. Observed mortality among persons reporting only acute illness in 1948 is actually less than expectation for cardiovascular and "other" deaths.

A comparison of the current prevalence of heart disease, asthma, and arthritis or rheumatism among survivors of the 1948 episode and three other population groups is presented in Table 4. The information for the 1957 residents of Donora, for the Arsenal Health District of Pittsburgh, and for Butler County, Pa., was obtained from surveys conducted in these areas employing essentially identical questions and technics to those used in the Donora follow-up. While variations in the rates of the three illnesses considered are present in the four columns of the table, there is little evidence to suggest that survivors of the 1948 Donora episode differ from current residents of the borough (1948 residents diluted by persons moving into the borough since 1948) or from persons residing in the two other nearby communities, as far as prevalence of these diseases is concerned.

The findings presented thus far have demonstrated that differences in subsequent health experience do exist between persons who became acutely ill during the episode and those who did not, but, in general, this difference appears to be due principally to health conditions existing prior to the episode. A question of paramount interest is, "Did illness experience vary with exposure to pollutants?" Lacking a direct measure of the exposure of each Donora

person to air-borne pollutants before, during, or following the 1948 episode, a search for indirect measures of exposure was undertaken. The period of residence in the Donora environment, the place of residence in the community, the occupation and place of work, and other similar variables suggest themselves as bases for classifications which might reasonably be expected to exhibit variation in illness rates. Our examination of this question, while admittedly incomplete and of necessity crude, has produced little that would suggest that variations in these environmental factors are associated with health effects which are measurable in terms of the available data.

Information was also obtained in 1957 concerning the smoking histories of the survivors of the 1948 episode. Our investigation of the relation of "personal air pollution" caused by smoking to the illness reaction both during and subsequent to the 1948 episode may be useful as an illustration of the kinds of problems encountered.

Among the persons surviving in 1957 who could be personally questioned concerning their smoking habits (approximately 80 per cent of the total study group), there is no evidence that those who smoked tobacco in any form prior to October, 1948, became ill during the episode at a higher rate than those who did not smoke. The 1948-1957 illness experience of male smokers when contrasted with the experience of males who have never smoked, is in the direction of higher rates of illness for the

Table 4—Prevalence per 1,000 Population of Specified Conditions in Donora, Pittsburgh, and Butler County, Pa., by Age

Disease or Condition	Age	Survivors of 1948 Donora Survey*		1957 Donora Sample		Arsenal Health District, 1952		Butler County, Pa., 1954	
Heart disease	0-14	4		3		10		6	
	15-24	7		6		11		10	
	25-34	8		12		6		19	
	35-44	18		8		18		17	
	45-54	51		30		29		55	
	55-64	55		68		59		86	
	65 and over	99		90		77		97	
Asthma	0-14	7		9		6		19	
	15-24	12		11		6		12	
	25-34	15		15		6		11	
	35-44	13		13		21		17	
	45-54	24		19		9		19	
	55-64	20		43		24		54	
	65 and over	51		44		33		29	
Arthritis or rheumatism		Male	Female	Male	Female	Male	Female	Male	Female
	35-44	64	61	37	97	37	71	39	85
	45-54	98	208	98	233	48	121	70	129
	55-64	211	254	209	229	91	158	130	204
	65 and over	205	270	175	268	172	264	213	315

* Age as of 1948.

Table 5—Illness Status of Nonsmoking Males 12 to 20 Years of Age in 1948, and Cumulative Frequency with Which the Smoking Habit Was Acquired, by Specified Age Between 1948 and 1957

Illness Status in 1948	Number	Nonsmokers Who Began to Smoke Cigarettes by Specified Age (Cumulated rate per 100 nonsmokers in 1948)															
		13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Ill	44	0	0	6	11	19	25	30	39	46	50	57	62	62	64	72	77
Not ill	100	0	0	0	4	9	16	20	27	33	36	40	44	48	51	51	58

group which has smoked. With few exceptions the males who became ill during the episode and who smoked before the episode have the highest rates, while the nonsmokers who did not become ill during the episode have the lowest rates. No consistent patterns could be discerned among the females. In general, the findings for the males are similar to the linkage between smoking and various kinds of illness reported from the many recent investigations of this association.[6,7]

A simple interpretation of these findings for the males would be that personal air pollution arising from smoking contributes in an additive way to the subsequent illness differentials already demonstrated between the persons who became ill during the 1948 episode and those who did not. That such an interpretation may not be warranted can be demonstrated directly from these data. Two questions can be raised concerning this interpretation of the smoking-sickness association: First, since prior illness has been shown to be related to the subsequent mortality and morbidity differentials between the group who became acutely ill and those who did not become ill, what relation exists between smoking history and illness prior to 1948? Second, did the acquisition of the smoking habit differ according to past illness experience?

Unfortunately, since the smoking question was asked only of persons surviving in 1957, we cannot shed any light on the first question. With respect to the second question, the data in Table 5 relate illness status, as reported in 1948, to the subsequent smoking experience of a group of young males. Among the individuals interviewed in 1957, there are 144 males who were between the ages of 12 and 20 years in 1948 and who stated that they had not begun to smoke prior to the survey date in 1948. The cumulative frequency with which the smoking habit was acquired by specified age has been estimated separately for the males who became acutely ill in 1948 and those who were not reported ill at the time. Although the numbers in Table 5 are too small to warrant definitive conclusions, the calculations clearly indicate that males who became ill in 1948 have since acquired the smoking habit more frequently and at a more rapid rate than those who were not reported ill at the time. Similar calculations for young females showed no consistent pattern, probably because of the small number of this group who acquired the smoking habit in the period considered.

These findings, together with those of Fisher[8] and the considerations of Berkson,[9] emphasize the need to investigate how the smoking habit is acquired, and by whom, in order to understand the meaning of the observed relationships between smoking and morbidity or mortality.

Discussion

The essential findings of this investigation are that persons who reported acute illness at the time of the smog episode have demonstrated subsequently higher mortality and prevalence of illness than the other persons living in the community at that time. Furthermore, persons who complained of more severe acute illness in 1948 demonstrate greater subsequent morbidity and mortality than persons with mild complaints. There is some evidence in these data that this greater morbidity and mortality is related to the cardiorespiratory system. When persons who reported chronic cardiorespiratory illness which antedated the 1948 episode are removed from the comparisons, the differentials in subsequent illness experience between the acutely ill and those who did not experience illness are narrowed considerably. Finally, no substantial or consistent relations between environmental variables and health experience could be demonstrated.

In terms of the study of air pollution and its relationship to health and disease, these findings raise three central questions:

1. To what extent is the subsequent health experience of those persons who became ill during the episode related to complaints first arising during the episode or to complaints present before the episode?
2. To what extent is the greater morbidity and mortality a direct consequence of (a) a short-term massive exposure to air pollutants, (b) a continued exposure both before and after the episode, and (c) a combination of (a) and (b)?
3. To what extent are the manifestations of sickness specifically related to the particular pollutants in the Donora air?

In discussing the first question, the association reported in 1949 in the U. S. Public Health Service analysis between a prior history of cardiorespiratory conditions and acute illness during the episode continues into the period of follow-up considered here. Our data show, however, that even the persons who denied a history of heart disease before October, 1949, but became ill during the episode, have had a higher subsequent morbidity rate than persons of the same age and sex who did not become ill. Further, though the difference is less marked, mortality in the former group is also slightly higher than in the latter. Taking these findings at face value, it would seem that subsequent health experience is related to complaints first arising during the 1948 episode. The basic assumption in this inference is that persons who denied a history of cardiorespiratory conditions actually did not have them, and conversely, that those who reported them did. Our experience in other surveys indicates that there is considerable under-reporting of impairments in interview surveys.[10,11] If any significant amount of such understating of previous illness did exist in the survey of 1948, the meaning of the findings might be that the discomforts of the smog episode served only to bring out or emphasize already existing impairments.

With respect to the second question, our analysis has attempted to construct classifications of environmental variables presumably related to exposure and to compare variation in these classifications with the illness history during and after the episode. From this analysis we had hoped to obtain an indication of the relative significance of the acute episode and the chronic exposure over the years. However, no clear relationship between illness and environmental variables has been established. The comparison of chronic disease prevalence among 1957 residents of Donora and survivors of the 1948 study group might reasonably have been expected to show a difference if the episode alone had any long-term effects on the subsequent health of those exposed. No such difference could be demonstrated.

Among persons reporting a history of

prior cardiorespiratory illness, those between the ages 21-50 show a differential subsequent mortality depending upon their reaction to the smog episode. This finding is pertinent to both our first and second questions. In relation to question 1, the differential mortality in the age group 21-50, if real, would indicate that the reaction to the smog episode played a role even among those whose impairment antedated the episode. This role may have been one of aggravating the existing cardiorespiratory condition or simply one of labeling those cases which were the more severe or disabling. The failure to find a mortality difference in the age group 50 and older between the group who became ill during the episode and those who did not, again if real, is disturbing. If either the "labeling" or the "aggravating" hypothesis is correct, we would have expected to find a mortality differential in this age group. That we did not find a differential may be a chance occurrence, or it may be that our time period is long enough to give competitive causes of death a chance to operate and thus obscure the picture.

In regard to the third question, although the Donora data do point to some effects on the cardiorespiratory system, they do not provide the means for relating particular pollutants to specific symptoms. Without such specific information it is difficult, if not impossible, to distinguish between those persons whose disease conditions conceivably could be due to exposure to air pollution from persons whose disease conditions are due to other factors. In this same connection, the lack of knowledge as to what syndrome(s) appears most pertinent for air-pollution health studies is a vexing problem for all researchers in this area. Therefore, although we know that an answer to this question is vital for the understanding of not only the Donora experience, but also of the relationship of air pollution to health in general, we find no way in which the analysis of the data now in our possession can provide an answer.

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A number of studies are described in which mortality is investigated in relation to air pollution. The possibilities, difficulties, and results are discussed so as to provide an over-all view of the present status of this aspect of the air pollution problem.

MORTALITY STUDIES IN RELATION TO AIR POLLUTION

John Rumford, M.A.

EXPERIENCE gathered from acute episodes indicated that high levels of air pollution can make people seriously ill and cause death. Considerably less is known, however, about the health effects of long-term exposure to so-called normal levels of air pollution. Definitive answers to this question are being sought in laboratories, in clinics, and in the field throughout the country. Laboratory and clinical research are inherently time consuming, expensive, and require basic hypotheses or "leads" from which to work. Hypotheses or "leads" may be gathered from actual morbidity or mortality experience in communities where air pollution is considered a problem. Morbidity data are preferable; however, morbidity data suitable for air pollution work are extremely difficult to obtain. Mortality data, on the other hand, are usually readily available in a convenient form.

Studies of air pollution utilizing mortality data may be somewhat crude because mortality is the final result of ill health, so that the certified cause may not reflect the pertinent contribution of air pollution. In studying the subtle effects of an adverse environmental factor, such as chronic exposure to low concentration of air pollutants, mortality may not be a particularly sensitive indicator.[1] Despite this handicap, however, studies of mortality do offer a relatively simple and available approach to search for relations between air pollution and health. This paper presents to interested investigators examples of some methodological procedures which, though certainly not the only ones, offer means to utilize urban census, mortality, and other data routinely collected by state or local agencies.

Mortality-air pollution studies made by the Air Pollution Medical Program, Public Health Service, fall into two categories: (1) those concerned with intraarea variations in mortality using individual geographic units of an area, and (2) those dealing with temporal variations in mortality of a complete geographic unit.

The intracity or intraarea investigations are usually based on the assumption that if there is an association between manifestations of air pollution and mortality, then residents living in areas of high pollution should experience higher mortality rates. Because polluted areas usually have other adverse environmental conditions present, the total socioeconomic complex of the area must be considered.

The first step in preparing an analysis of this type is to subdivide the study area into components where population statistics can be obtained. Usually, this subdivision has been done by some agency in the area. Major units used

are the census tract, the community area, the economic area, or the health district. The second step is to characterize these areas in terms of manifestations of air pollution as well as other factors, such as income, housing, education, racial composition, and others that are relevant.

In order to establish comparisons between residential mortality and residential environmental factors, each parameter must be characterized and generalized. Mortality for any one year is of limited value. The problem is not one of specific mortality for a short period of time, but rather to determine the over-all long-term pattern of these parameters. To cope with this problem, we generally compute a three- or five-year mean mortality rate, standardize the rates by area, and compare these standardized mean mortality rates with the pattern presented by the environmental factors. Usually, environmental factors of the residential areas are somewhat more stable than the mortality. Although absolute air pollution values vary from year to year, the areas which are high in air pollution usually remain consistently high, due to the stability of the pollution source.

Once the areas are quantitatively characterized as to mortality, air pollution, and socioeconomic conditions, the problem becomes one of determining which environmental factor is more closely associated with mortality variation. Two examples illustrate the intra-area type of investigation. They utilize data which were obtained from Philadelphia and Chicago.

The Philadelphia Health District Study presents a model designed to determine health district variations in mortality, using causes previously found to be associated with air pollution episodes, and to ascertain whether mortality variations are more closely associated with variations in air pollution or with other environmental variables.

Mortality by health district was tabulated by cause and age for the years 1954 through 1956. In order to standardize mortality differences for health district comparisons, a relative mortality index was computed for each cause. This method is described in detail by Woolsey in "Vital Statistics Rates in the U. S., 1900-1940." It was necessary to use the relative mortality index because estimates of population by age and by health district for 1954 through 1956 were not available.

The available air pollution data for Philadelphia were then analyzed. Unfortunately, air pollution measurements were extremely limited. This was due to the fact that the air monitoring program in Philadelphia had not been in city-wide operation for enough time to accumulate a backlog of data. Dustfall for the year 1958 was the only aerometric datum which was available for all ten health districts. As will be noted, dustfall and mortality are chronologically dissimilar; it was therefore necessary to assume that relative dustfall variation for health districts remained geographically constant through time. Appropriate interpolations were made where necessary. These interpolations were based on the assumption that an average of the dustfall between two or more monitoring stations within or adjacent to each health district was the best available estimate of the relative dustfall for the entire district. Unfortunately, arbitrary decisions are necessary in computing the dustfall interpolations. The Air Pollution Engineering Program is currently conducting research to clarify this problem. As crude as these data were, the relative dustfall variation among health districts agreed reasonably well with the general land use pattern for industrial and commercial air pollution sources in the city.

Simple linear correlations were computed between dustfall and mortality from hypertensive, arteriosclerotic, and

chronic rheumatic heart diseases, other cardiac diseases, malignant neoplasms and tuberculosis of the respiratory tract, asthma, bronchitis, and pneumonia. Significant correlations were found between dustfall and pneumonia, tuberculosis, chronic rheumatic heart disease, other diseases of the heart, and arteriosclerotic heart disease.

Because some of the foregoing diseases may be related to other adverse environmental conditions, a correlation matrix was computed for seven available environmental attributes which provide indexes of socioeconomic level in the health district. Four of these were found to be representative of the seven chosen. They were percentage of dwellings with more than 1.01 persons per room; percentage of persons with income less than $2,000; percentage of persons over 25 years old with less than five years education; and percentage of nonwhite persons.

Simple linear coefficients were computed between mortality for the five significant causes and the four socioeconomic indexes. Of the 20 correlations, 17 were significant with nearly all socioeconomic indexes. The simultaneous relationship between mortality, dustfall, and the socioeconomic variables were studied by two methods: graphically, by use of scattergrams, and by multiple variate analysis, using partial and multiple regression.

The preliminary results of the graphic and multiple correlation analysis suggested that variation in mortality for tuberculosis and "other diseases of the heart" were more closely associated with indexes of socioeconomic condition than with dustfall. Pneumonia and arteriosclerotic heart disease were apparently equally influenced by variation in dustfall and socioeconomic variables. Variation in mortality from chronic rheumatic heart disease was more strongly related to dustfall than to any of the indexes of socioeconomic condition which were used. Such a relationship should be studied further to see whether there is a true association. Figure 1 indicates a summary of the results of the multiple correlation analysis.

The second example of an intraarea type of study was done with data obtained from the city of Chicago. This was a pilot effort to develop and test methods applicable to microunits of a large metropolitan area.

Three approaches and their results are presented. The first approach compared mortality variations among residents who live in manufacturing and nonmanufacturing areas in Chicago. The second approach was to investigate the mortality experience among residents who live less than one mile, and one to two miles from a large integrated primary metals plant. The third approach was to study residential mortality variation in relation to prevalent wind direction blowing from this source.

Since residence within a particular census tract was of prime importance, the study population used in all three approaches comprised white females. This group would be expected to spend relatively much more time at the residential address than males, and was least likely to have experienced occupation exposure, since approximately 50 per cent were not in the reportable working force. The method employed to compare mortality variations among white female residents living in manufacturing and nonmanufacturing community areas was to match pairs of community areas by appropriate socioeconomic variables and employment densities; i.e., number of employees per acre of land used for industries whose processes are inherently productive of air pollution such as metals, petroleum, coal, and the like. Of the 75 community areas in Chicago, only four pairs could be found which were similar with regard to such socioeconomic conditions as income, education, overcrowding,

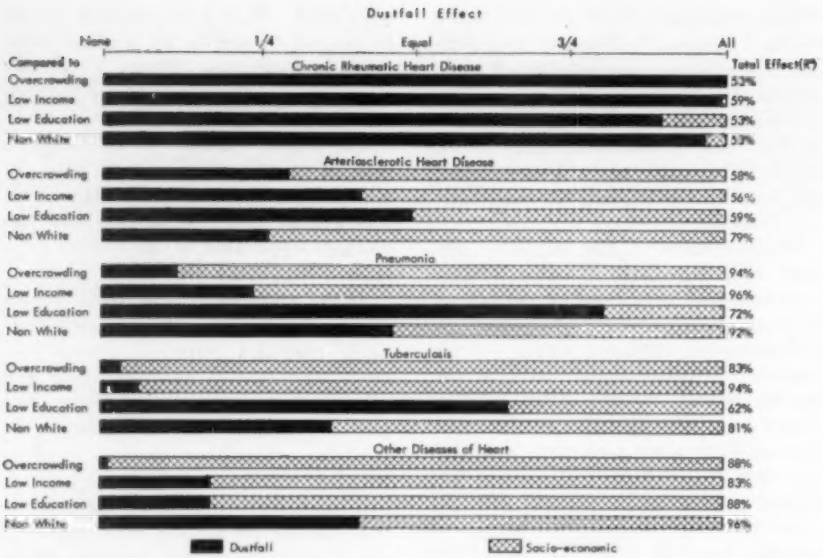

Figure 1—The Contribution of Dustfall in Comparison to Four Socioeconomic Factors in Multiple Regression with Mortality for Health Districts in Philadelphia (1954-1956)

dilapidated dwellings, and females in the working force, and were dissimilar only in employment density for the industries mentioned in the foregoing.

Mean standardized mortality rates (1953-1955) for diseases associated with air pollution episodes were computed for each pair. The direct method of age adjustment was used. The population base comprised the totality of white females in Chicago for 1950.

The results of the manufacturing-nonmanufacturing comparisons suggested that residents of nearly all manufacturing areas experienced higher mortality than residents in nonmanufacturing areas. This difference was greatest for cancer and tuberculosis of the respiratory tract, chronic rheumatic and hypertensive heart disease, and other diseases of heart. Whether these differences were due solely to air pollution in manufacturing districts is difficult to determine. This study does suggest, however, that air pollution may be a factor in differential mortality. Figure 2 indicates the results of this comparison.

The second approach was to investigate mortality experience among residents who live less than one mile, and one to two miles from a large primary metals plant. It was assumed that effluents originating from the suspect plant would produce their most toxic effect in residential areas immediately surrounding the plant. The linear distance was restricted to two miles in order to avoid pollutant competition which may have originated from some other source.

Mean white female mortality (1953-1955) from the previously indicated causes was tabulated and standardized by census tracts within the one and two mile limits. Census tracts whose boundaries were not confined to one

or the other area were disregarded. Two comparisons were made: the first compared mortality by distance from the plant with no adjustment made for socioeconomic condition; the second compared mortality by census tracts which were socioeconomic equals.

In both instances, the mortality experience in census tracts less than one mile from the plant was over 30 per cent higher than mortality in census tracts one to two miles from the plant. These results are indicated in Figure 3.

The third investigation which utilized mortality data from Chicago was to explore the possibility that prevalent winds blowing across the primary metals plant were influential in adversely affecting mortality among white female residents living in census tracts downwind and less than one mile from the plant.

The frequencies of wind directions were computed from 14 years of continuous data from the Midway Airport. The assumption was made that all minor discrepancies would be removed by this volume of wind data. The residential areas surrounding the plant were subdivided into quadrants. Criteria for the division were based on observed wind prevalence and equal distribution of area around the plant. Each area was characterized as to socioeconomic conditions; these were median income, dilapidated dwellings, overcrowding, and median school years.

Standardized white female mortality rates for the total nine general causes were combined and computed for each quadrant. The results indicated that standardized mortality rates were highest for residents in the quadrants which were more frequently in the path of winds blowing across the plants. Socio-

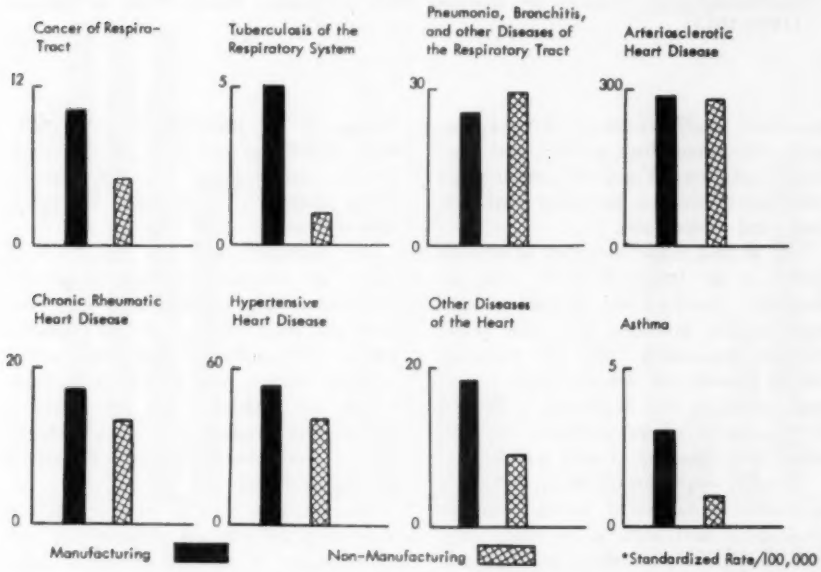

Figure 2—Comparison of Standardized White Female Mortality Rates* for Matching Socioeconomic Pairs of Manufacturing and Nonmanufacturing Community Areas in Chicago (1953-1955)

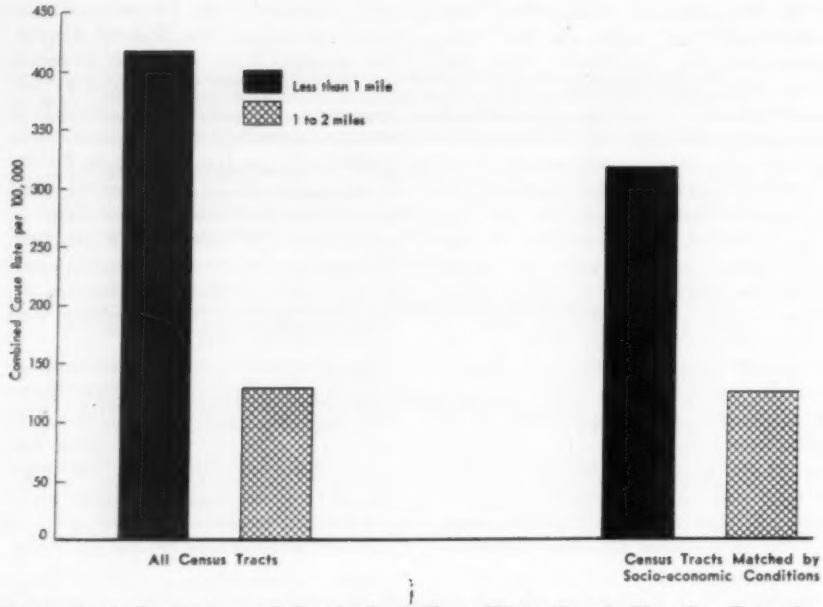

Figure 3—A Comparison of Standardized Mean White Female Mortality Rates for Cardiorespiratory Diseases by Distance from a Primary Metals Plant in Chicago (1953-1955)

economic conditions of the area apparently contributed little to the noted mortality variation. Figure 4 indicates the relationship beween mortality variation and wind frequencies.

The second major category of investigation is the temporal study. The assumption involved in studies of this type is that mortality rates for select diseases associated with air pollution should increase or decrease with abnormal increases or decreases in actual measurements of air pollution, or with other manifestations of such pollution.

Usually, cause-specific daily or weekly mortality is tabulated for a complete geographic unit, such as an entire city. It is preferable, however, for temporal mortality tabulations to be made in subdivisions of the geographic unit. The latter is preferred because sharp increases in air pollution in a normally high pollution area will be of much greater consequence than an equally sharp increase in a normally low pollution section.

Air pollution data for this kind of study are extremely difficult to obtain. Consistent daily measurements of pollution are required for several stations. Often it is possible to obtain data about weather factors, such as inversions, from which air pollution can be inferred. but in the present state of knowledge this is both dangerous and extremely difficult to handle.

The methods used in temporal studies vary with the selected geographical and time units. If an entire city is used, sharp fluctuations (by sharp, I mean abnormal departures from the normal levels) in air pollution are graphically

plotted with mortality incidence. Along with air pollution levels, weather factors such as maximum and minimum air temperatures, rainfall, snowfall, humidity, and so forth, are plotted as third variables. The experience usually encountered is that positive fluctuations occur in all variables when certain air pollution threshold levels are reached. Therefore, one encounters the difficulty of determining which variable fluctuated more directly with mortality.

An outstanding example of this was illustrated in New York City in 1956. During a four-day period in the month of October, an extensive high pressure air mass centering over New York City created extremely stagnant atmospheric conditions. During this time period sharp increases occurred in cardiovascular mortality. The general consensus, at this time, indicated that extreme temperature was the cause of the noted excess mortality.

In order to study the simultaneous relationship among the variables, daily cardiovascular mortality, dust count (one of the many air pollution measurements collected in New York City at this time), and maximum temperature were graphed. Figure 5 indicates the results.

Immediately apparent is the marked peak in both maximum temperature and air pollution, particularly, the latter. Also apparent is the two-day lag between temperature and mortality in contrast to the simultaneous occurrence of the dust count peak and the mortality peak.

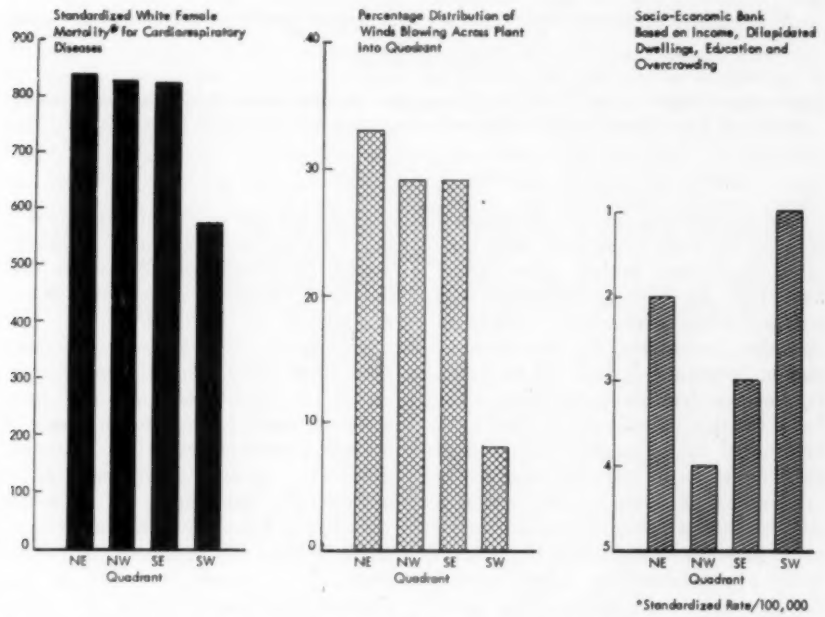

Figure 4—Summary Table by Residential Quadrant of Standardized White Female Mortality, Wind Frequencies Carrying Effluents to Area, and Socioeconomic Level of Areas Which Are 0 to 1 Mile from a Primary Metals Plant in Chicago (1953-1955)

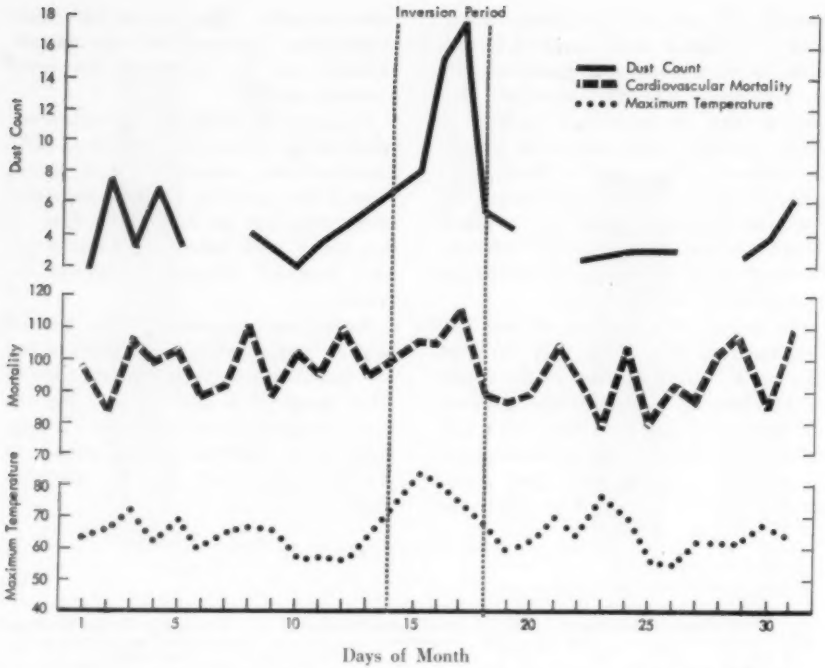

Figure 5—Comparison of Daily Cardiovascular Mortality with Daily Average Measurements of Dust Count and Maximum Temperature for New York City, October, 1956

The second example of a temporal study is the work being done with mortality data from several cities which have been involved in prolonged steel strikes. These studies are unique in that they investigate the possible association between a decrease in air pollution with a decrease in mortality. The basis for this investigation is the work being done by the sanitary engineers of the Public Health Service who are in the process of analyzing air pollution data in several primary steel-producing areas in order to determine if pollution levels are substantially below normal during recent steel strikes. The basic assumption in this investigation is that the number of deaths for causes previously associated with air pollution should be lower during a strike period than during a comparable nonstrike period. The results of this investigation should be ready for presentation in the near future.

Admittedly, the investigations and their methodologies suffer from handicaps. The populations in some cases were too small for significance tests of a small percentage effect; air pollution data were extremely limited. It is obvious also that there are numerous variables and conflicting factors in studies of the type just presented. However, attempts are made to recognize the various complexities and to give them due consideration in evaluating the final significance of the investigations. In spite of the recognized reservations, the

Air Pollution Medical Program hopes such studies will assist, guide, and stimulate air pollution-health studies.

Investigations using readily available data on air pollution, mortality, socio-economic condition, and population afford local health departments one means of making simple, preliminary evaluations of the possible health effects of air pollution.

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This paper was presented before a Joint Session of the Conference of Municipal Public Health Engineers, the Conference of State Sanitary Engineers, and the Engineering and Sanitation, Occupational Health, and Statistics Sections of the American Public Health Association at the Eighty-Seventh Annual Meeting in Atlantic City, N. J., October 22, 1959.

Orthopsychiatric Group to Meet

The American Orthopsychiatric Association will convene for its 38th annual meeting at the Hotel Statler-Hilton, New York City, March 22-25, 1961.

Rene Dubos, Ph.D., professor at the Rockefeller Institute, will address a presidential session on problems of biological adaptations of children to modern society. William S. Langford, M.D., professor of psychiatry at Columbia University College of Physicians and Surgeons, will deliver the presidential address on adaptation of the child in the pediatric hospital to illness and hospitalization. Other conference topics to be covered include: Contributions of Public Health to Community Mental Health Programming (Joint workshop of the American Orthopsychiatric Association and the Mental Health Section of the American Public Health Association); Community Organization Function of the Community Mental Health Center; Public Mental Health Practices: Implications for Aid to Dependent Children Program; and State Staff Assistance to Local Mental Health Units.

Further information from Marion F. Langer, Ph.D., Executive Secretary, American Orthopsychiatric Association, 1790 Broadway, New York 19, N. Y.

Control of air pollution is increasingly the avowed aim of numerous American communities. Various problems and considerations are discussed in the paper presented here. Most important, however, is that the goal can to a large extent be achieved and that it provides benefits that are not only economic or esthetic.

AIR POLLUTION CONTROL IN URBAN PLANNING

Lee Schreibeis, Jr., B.S.C.E., M.P.H.; John J. Grove, M.A.; and Herbert R. Domke, M.D., Dr.P.H., F.A.P.H.A.

THE CITY of Pittsburgh and the county of Allegheny have learned that air pollution control is a decisive factor in community planning. Pittsburgh's history is a parallel story of success and defeat. Built on vast soft coal fields and favored by location, climate, and navigable rivers, nineteenth century Pittsburgh grew rapidly into the coal, iron, and steel capital of the world. It was the center of a booming industrial region, a rewarding city for capital investment and a good workingman's town.

At the same time Pittsburgh was becoming deeply scarred with age and blight. Thick smogs hung almost continually over its deep river valleys, giving it world-wide notoriety as "The Smoky City." Sprawling slums surrounded the mills and clung to adjoining slopes. Streets and other public services were inadequate, and recreational and cultural opportunities limited. In this dark and unattractive Steel City, civic pride was almost unknown.

By 1940 the symptoms of decay were obvious, indicating serious threat to the economic future of the Pittsburgh region. Because of the unpleasant environment, industrial corporations were having great difficulty securing and retaining managerial and scientific personnel. Housewives were aggravated by the constant battle against smog and grit. Businessmen faced mounting expenses in replacing smog-soiled goods, in maintaining blackened buildings, and in keeping lights on in midday. Financiers regarded Pittsburgh as a poor city for investment, and it appeared that the city and region faced a steady and inevitable decline. Fortunately, civic and political leaders began a vigorous long-range program to reverse the backward drift and to revitalize the entire community.

Although the Pittsburgh area suffered from many ills, it was universally agreed that its most important civic problem was smoke. Unless the skies were cleared of their heavy and depressing pollution, it hardly mattered whether any other improvements were made or not. This was by no means a new idea in 1940. For nearly 150 years Pittsburgh had hoped to reduce smoke and, since 1892, the city had smoke control laws on its books. But little real success had been achieved, for it was commonly accepted that "smoke means prosperity" and that air pollution

is a necessary evil in an industrial community.

In 1941 a new movement to reduce smoke resulted in the enactment of a revised and substantially improved ordinance. But enforcement was postponed because of the war emergency. However, by the closing years of World War II, the business and political leaders gave their cooperation to the restoration of the Pittsburgh area; the general public supported the program; and technical advances made major changes feasible.

The Allegheny Conference on Community Development was formed as a privately financed, nonpartisan citizen organization to spearhead a broad improvement program. In the fall of 1945 the United Smoke Council became an action committee of the Allegheny Conference. Soon an all-out campaign was under way to enforce the ordinance of 1941 and to rid Pittsburgh of its gloomy black smogs. Industry was brought under the antismoke law first on October 1, 1946, and a year later the provisions were extended to private homes within the city limits.

Shortly after Pittsburgh's antipollution program began, a new campaign was started to extend the benefits of cleaner air to surrounding Allegheny County. Enabling legislation was obtained in 1947 from the State Legislature. A Smoke Control Advisory Committee, composed of scientists, businessmen, labor representatives, and private citizens, was appointed to draft an ordinance for county areas outside of Pittsburgh. When the law was enacted 18 months later, all of Allegheny County was on its way to achieving one of the most successful air cleaning programs in municipal history. Today a unified county-wide smoke control program is administered and enforced by the Allegheny County Health Department.

Elimination of smoke has proved to be the foundation for a dramatic, region-wide redevelopment program. Consider the stimulation to civic morale which goes with the climb from a dirty and degraded city to one that is a leader in this field. Pittsburghers are now proud of their city and can be more confident of their ability to attack other major problems of urban renewal.

Much has been accomplished in air pollution control but, of course, these gains have to be maintained. Continuing public and industrial support, as well as further technological advance, are required if the gains are to be extended to air pollutants other than smoke. These other pollutants present additional problems, which may make it more difficult to obtain the degree of air cleaning that will be required. Planning for the next stages of advance in air pollution control will require more accurate appraisal of the kind, quantity, and source of the various pollutants; better technics for control at the source; and precise, enforceable control measures in proper legal form as ordinances.

Air Pollution Sources

One of the most common public misconceptions about air pollution is the significance of various sources. Here appearances are often deceiving. Many times the public points at large visible sources of smoke from manufacturing plants and says by implication: "If that pollution were stopped, our discomfort would be resolved." The facts do not support this general approach. True, industrial sources are extremely important, but they are only a part of the over-all problem. Today, increasingly reliable estimates indicate the contribution made by various sources.

Sources can be classified in several ways, but to simplify these considerations, two broad categories are suggested:

1. Industrial, which includes manufacturing, service, and transportation industries; and

2. Public Activities, which include automobile operation, home heating and domestic fuel consumption, back yard burning, and other similar actions.

The first category, in general, represents smaller numbers of larger single sources (Industrial), while the second comprises larger numbers of small sources (Public Activities). It is now recognized that both types of sources contribute significantly to atmospheric contamination and that both should, therefore, contribute toward reducing their emissions. Plans need to include such recognition of the sources.

It is increasingly evident that general public activities, such as automobile usage, home heating, and back yard refuse burning, are extremely important sources of various particulate, gaseous, and vaporous air pollutants in our metropolitan areas.

For example, R. S. Scorer,[1] an English author, concluded that home heating and automobile and truck use were responsible for 90.5 per cent of the $750 million per year damages estimated to occur in Great Britain. Railways, he reported, are causing an estimated 4.0 per cent of the total damage, and these were followed by the lesser contributions of industrial sources with 2.8 per cent, and electrical generating stations with 0.3 per cent. These estimates cannot, of course, be applied directly to Pittsburgh or other American communities. However, the report demonstrates the need for caution in pointing to the industrial source as the principal offender.

Investigators[2] of the Los Angeles air pollution condition have reported that organic vapor emissions from automobiles amounted to approximately 1,200 tons per day in 1955. This, alone, was estimated to be 60 per cent of the total organic vapor emissions. These vapors are important in Los Angeles because, in the presence of other contaminants and sunlight, they form oxidizing substances causing eye irritation and possibly other effects. Recent tests indicate this now also may be a problem in the Pittsburgh area.

Each community is likely to have peculiar or unique sources but, in general, the contaminants of greatest significance are:

1. Particulate matter of both small and large sizes
2. Sulfur dioxide and trioxide
3. Hydrogen sulfide
4. Oxidants
5. Oxides of nitrogen
6. Organic vapors
7. Miscellaneous other specific substances

In the Pittsburgh Ordinance, adopted in 1941, and the Allegheny County Ordinance, adopted in 1949, individual home owners were required to burn so-called "smokeless fuels" unless using mechanical solid fuel-burning equipment. Residents were also prohibited from burning rubbish or other materials in the open air. Various industries and the railroad and river transportation operations were also required to meet specific emission standards. The great reduction in smoke pollution in Pittsburgh from 1946 to 1959 is shown in Figure 1. This was due primarily to the individual home owner or tenant and the railroad and river transportation operations. The individual shifted from coal to gas in home heating, water heating, and so forth. The transportation industries also shifted from coal fuel to oil-burning diesels.

In the case of domestic operations in 1946, there were an estimated 80 per cent of 300,000 dwelling units employing coal for fuel. Today, by reliable estimates, there are 9 per cent of 400,000 dwellings using coal. This amounts to a reduction from 240,000 to 36,000 coal-burning units (85 per cent) in 13 years.

The conversion figures for the railroad and river traffic are even more dramatic. All locomotives and boats

have been dieselized. This results in about a hundredfold reduction in the emission of cinders, fly ash, and smoke per unit. Table 1 shows the dustfall reduction in Pittsburgh since 1939-1940. Of course, many sources other than locomotives and boats contributed to this reduction but their improvement was unquestionably most important.

Fuels and Consumption Rates

The type of fuel consumed has an important bearing on the magnitude of the pollution problem as the foregoing section indicated. The amount of ash in fuels will be a direct indicator of the potential dust or fly ash pollution that can be expected. Coal

Figure 1—Smoke Reduction Based on U. S. Weather Bureau Visibility Observations, Pittsburgh, Pa., 1946-1958

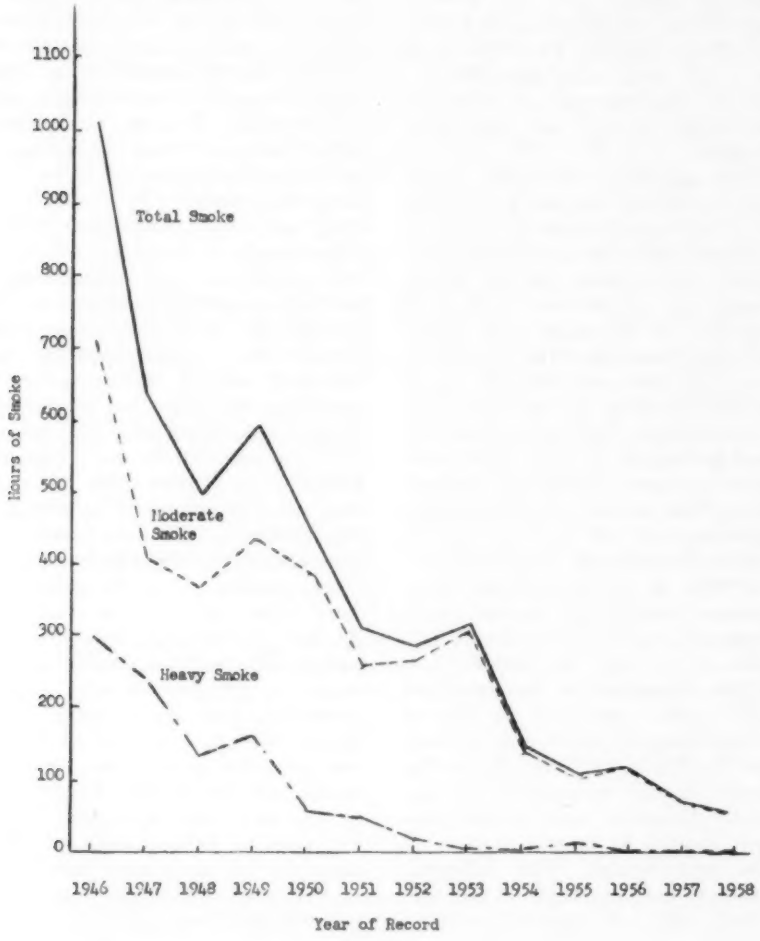

Table 1—Insoluble Dustfall Settling Rates for Six Locations in Pittsburgh Concentrations Expressed in Tons per Square Mile per Month

Year	Range of Lowest to Highest Rate	Average of Six Locations
1939-1940	32.6 to 97.0	58.6
1948	33.8 to 79.0	51.5
1958	22.0 to 39.0	30.5

fuels will usually have ash contents ranging from 5 to 20 per cent or higher. Oil fuels of even the lowest prices do not contain much more than 0.10 per cent ash. Natural gas and other gas fuels contain infinitesimal amounts of ash solids.

Other impurities, principally sulfur, occur in varying amounts in different fuels. Coal and oil may contain up to 5 per cent sulfur, but natural and other domestic gas supplies contain minute amounts, if any, of sulfur. Table 2 shows the fuel consumption by type in the United States and Pennsylvania for the periods 1946 and 1954. The trend has been toward oil and gas fuels. Note the much higher coal percentages consumed in Pennsylvania, the largest coal-producing state. However, Pennsylvania is also moving toward increased consumption of oil and gas and a decrease in total coal consumption.

In 1946, at the start of the smoke abatement program, fuel consumption in Allegheny County was equivalent to 17.7 million tons of coal. In 1954, the consumption amounted to the equivalent of 20.1 million tons, but the type of fuel had changed considerably, as indicated by Table 2. Thus, despite an increase in fuel consumption, a concurrent change in type of fuel consumed resulted in large reductions in smoke and dustfall. This difference emphasizes the importance of the type of fuel used. Incidentally, such a change makes it more difficult to assess the effect of control activities by a governmental agency. This Pittsburgh experience demonstrates, however, that increased population, increased industrial activity, and associated increases in all types of public activity can occur without increasing air pollution.

Economic Considerations

Costs are as important in air pollution control as in water supply, sewage treatment, or any other environmental facility. Where air contaminants may affect the health of the public, the cost of controlling the operation and equipment is secondary to achieving an effective solution. However, air pollution effects are most frequently productive of nuisance and personal irritation or property damage.

In such cases there appears to be some latitude in discussing costs of control as well as costs of the irritation and nuisance. What costs are involved for the housewife who must clean porches and outdoor furniture daily instead of weekly? What value can be placed on the depression produced in people by the appearance of grime and soot on windows, walls, and automobiles within short periods after cleaning? How much is one abused by a stinking slaughterhouse, rendering plant, and chemical or other industrial operation? These questions cannot be answered in exact dollar values. On the other hand, the cost of controlling specific sources can be calculated accurately. For example, in Allegheny County domestic conversion from high volatile to approved fuels costs at least $3.25 more per ton at the present time. It is estimated that the average dwelling unit in this area uses seven tons of coal per year for heating purposes. Thus, domestic coal fuel users must spend approximately $22.75 per year for air pollution abatement.

Industrial pollution sources are so numerous that many, many examples could be cited of costs involved. The open hearth furnaces are among the costliest units to provide with collection equipment. Such equipment installed recently in the Pittsburgh area was reported to cost approximately $600,000 per furnace. Twelve open hearths out of 102 furnaces in the county have been so equipped. The operating costs of the collection equipment have been estimated at $100,000 per furnace per year. These costs are impressive, especially when, as at present, there is no value in the dust and fumes collected by the control devices. Furthermore, subsequent final disposition of the removed dust may be a further economic and refuse disposal problem.

In turning to enforcement by law, it is important to recognize clearly that no one approves or condones air pollution. The public, industrial management, and all other community groups are concerned and anxious to have clean air, free from health hazards. Unfortunately, the costs of control are considerable, whether for the individual home owner or for industry. Also, the damage caused by individual operations is not always demonstrable. Frequently, several or many sources may combine to produce an objectionable effect in the community. If one industry proceeds to install control equipment, but finds neighbors and competitors not following their example, the program of self-initiated pollution abatement is apt to end abruptly. The foregoing considerations point to the need for governmental action in adopting and enforcing equitable and effective general and community-wide control regulations.

The Air Pollution Code

Model smoke control codes have been developed by the American Society of Mechanical Engineers (ASME), the Coal Producers' Committee for Smoke Abatement (CPCSA), and the National Institute of Municipal Law Officers (NIMLO). Each of these model codes contains similar provisions and the most recent one, published by the ASME in 1948, has been used by many governmental agencies as a guide to developing and enacting a local ordinance. The ASME has appointed a new committee to consider amendments to the 1948 model code in the light of the great strides made in air pollution control in the past 11 years.

The sections of a code which deal with prohibitions are a measure of the intention to improve the air quality. In them are established emission limits and other standards which operators of pollution sources must satisfy. The contaminants for which standards are

Table 2—Type of Energy Consumption by Percentages in the United States and Pennsylvania During 1946 and 1954

	1946		1954	
	Pennsylvania	United States	Pennsylvania	United States
Coal	68.0	47.9	52.2	29.3
Bituminous	(48.5)	——	(41.6)	——
Anthracite	(19.5)	——	(10.6)	——
Oil	23.4	31.9	32.9	41.8
Gas	7.2	16.0	14.1	25.0
Water power	1.4	4.2	0.8	3.9

Table 3—Permissible Solid Emission Rates Given in Smoke and Air Pollution Control Ordinances

Ordinance	Date	Permissible Emission Rate in Lb of Solids/1,000 Lb of Gases*	Required Collection Efficiency Per cent
Allegheny County, Pa.	1954	0.65	85
ASME	1948	0.85	85
Cleveland, Ohio	1949	1.45	Not stated
Richmond, Va.	1947	2.0	Not stated
Cumberland, Md.	1947	2.5	Not stated

* Gases are adjusted to 50 per cent excess air in the products of combustion.

usually set include: (1) smoke; and (2) other solids described as either dust, fume, fly ash, cinders, or particulates. General prohibitions are also included in most ordinances. They prohibit creation of a nuisance to any person or a detriment to the property of others by the discharge of soot, gases, vapors, acids, or odors.

Existing local codes exhibit a wide variation in the permissible smoke emissions. In 82 ordinances examined by F. L. Seamens,[3] he reported a range of 14 different classifications of permissible smoke discharges. Ordinances of St. Louis, Syracuse, Montreal, and Pittsburgh have the most stringent smoke emission requirements. Some ordinances, however, only prohibited dense smoke but did not define the meaning of "dense."

There is also a wide variation in the permissible solids discharge rate in existing ordinances. Table 3 presents the present range for fuel-burning equipment.

Difficulty in achieving a satisfactory level of air pollution control can be considerable even though regulations may be stringent. In Allegheny County there is a town in which two large coal-consuming plants are operating in compliance with the provisions of the ordinance. Their collection efficiencies are actually 90 per cent and the emission rate is well below 0.65 lb per 1,000 lb. Yet people in the community justifiably complain at times of the fly ash from these plants. It is the type of dilemma for which a solution cannot easily be found.

In addition to these solid emission limits, the more recent trend in developing the terms of an ordinance specifies permissible emission rates for certain types of process equipment. This is based on the concept that emission product characteristics as well as the ability to control the emission must be considered. In the Allegheny County Code, for example, the following emission limits are found, as shown in Table 4.

Another new concept in ordinance content is to include requirements directed at the problem areas. For example, some codes have prohibitions dealing with specific industries, such as rendering plants, dry-cleaning, laundering, spray painting, or asphalt plant operations. Los Angeles and San Bernardino Counties have limitations on the sulfur compounds emitted from any combustion process, and Los Angeles has recently limited the sulfur content of fuels used during certain critical periods. As we gain experience and knowledge, control and abatement standards are constantly being increased.

Conclusion

In conclusion, I want to emphasize that the elimination of smoke is much

Table 4—Permissible Dust Emission Rates for Specific Equipment Allegheny County, Pa., Smoke Control Ordinance

Process Equipment	Permissible Emission Rate Lb of Solids/1,000 Lb of Gases
Incinerators	0.20
Heating and reheating furnaces	0.30
Blast furnaces	0.40
Cupolas	0.50
Open hearths, bessemers, electric furnaces, coke ovens, sintering plants, and nonferrous foundries	No limitations. Operators must conduct research to determine control methods.

more than a pleasant esthetic goal. Dense smoke and smog are barriers against all forms of community progress. No one wants to live in a dirty, grimy, choking environment, and all who can will leave. Industry itself will leave, if possible, because it cannot retain management personnel, scientists, or workers in gloomy and depressed neighborhoods.

Conversely, the achievement of air pollution control is an inspiration to private citizens, businessmen, and political leaders alike. In Pittsburgh and Allegheny County smoke control is a major civic achievement. Not only is the air cleaner, but so also is the city itself. Millions of dollars have recently been spent to clean buildings once there was assurance that buildings would remain clean for a reasonable period of time.

At the western tip of the Golden Triangle financial district, 60 acres of blight have been replaced by a 36-acre park and a commercial district of seven new buildings in a park-like setting—Gateway Center. Mellon Square Park has become the new heart of the midtown, with the Aluminum Company of America Building on one side and the 11-story Mellon-United States Steel Headquarters Building on the other. Nearby, 95 acres of former slums are being redeveloped with fine cultural, residential, and commercial structures. Similar advances have been made in flood control, highway construction, educational and cultural fields, parks and recreation, and other vital facets of community life. The direct rewards of smoke elimination are great, and the indirect rewards can be almost incalculable in value. Among them can be the restoration of civic pride, courage, and determination — the fundamental qualities on which all community progress rests.

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While the preceding papers have been concerned with the nature and consequences of pollution, and with planning for control, this contribution offers guidelines for those concerned with air pollution legislation, specifically at the state level. The guiding principles are presented clearly and usefully.

GUIDING PRINCIPLES FOR STATE AIR POLLUTION LEGISLATION

Frank Tetzlaff, P.E., F.A.P.H.A.; Samuel M. Rogers, M.S.P.H.; and Sidney Edelman, LL.B.

THE AIR supply of our communities has been shown to be limited in its capacity to serve as a receptor for air-borne waste products. We now recognize it as a limited resource, and it is now known that abuse of our air supply can have harmful effects on health, comfort, and property. Air pollution control efforts, therefore, are now beginning to be based on the premise that no one has the right to use the atmosphere as a receptor of wastes in a manner which will adversely affect the health, comfort, or property of others. It is recognized too that economic, social, and technical factors are concerned in air pollution control efforts and must be considered in the application of controls and in the appropriate modification of such controls.

Since the end of World War II, the increasing interest in the conservation of our air resource has been reflected to some extent by the development of state legislation. Within the last decade, more than 20 states have modified or adopted new legislation on air pollution, and a total of 28 states now have such legislation. Legislative activity at the local level has also increased during this period, and at the national level, Congress has enacted legislation providing for the Public Health Service program of research and technical assistance in air pollution.[1]

It is generally accepted that responsibility for administration of a program for the prevention and abatement of air pollution should be at that level of government capable of dealing with the problem in its entirety. While this may indicate the desirability of air pollution control programs at a local or regional level, due consideration should also be given to the role of the state. It is essential that jurisdictional boundaries be established coincidental with natural geographical and topographical features which may affect air pollution conditions in any local area.

The goal of air pollution legislation should be to maintain a reasonable degree of purity of our air resources consistent with:

a. public health and welfare
b. protection of plant and animal life
c. protection of physical property
d. visibility requirements for safe air and ground transportation

e. continued economic development and growth

f. maintenance of an esthetically acceptable environment.

In programs at all levels of government, control can be most effectively brought about only by legislation which is reasonable and based on technically-substantiated criteria, which provides adequate flexibility, and yet is reasonably specific to meet the needs of the area under consideration. It should be adapted to the structure and practices of the government of the state or community. The legislation should clearly establish its scope, specifically assign responsibility, and scrupulously avoid technical details, but set up instead the procedure by which such details are worked out, implemented, and revised to meet changing conditions. In this way a high degree of flexibility can be attained.

State air pollution control activity has developed traditionally from the authority of health departments to preserve public health. On the local government level, however, air pollution control authority has been vested in a variety of agencies, including health, building, fire, public safety, and other departments as well as air pollution control departments.

Early state statutes frequently provided an administrative approach which was largely negative in character. That is, when a particular activity was found to cause air pollution the administrative agency was authorized to take steps to abate such pollution. Newer legislation shows a shift in emphasis from the abatement of existing air pollution to control through prevention.

Sufficient research and painstaking legal drafting effort to meet a common problem undoubtedly would result in statutes having considerable similarity. Some degree of uniformity is justifiable and even desirable. In the field of air pollution, however, perhaps more than in any other problem of the environment, the causes of air pollution and the topographic, meteorologic, economic, social, and health factors provide such a wide range of variables that a variety of statutory approaches is inevitable.

A review of existing state air pollution legislation reveals that certain principles appear to be basic for the development of such legislation. While these guiding principles pertain principally to state-level legislation, they may also be applicable, with suitable modification, to local and regional legislation. They may be useful to state, regional, and local authorities in appraising their air pollution statutes and evaluating them in terms of their actual air pollution problems and the present status of technical knowledge. In this connection it is well to recognize the need to facilitate home rule and thereby provide greater flexibility in meeting local problems. Similarly, the regional approach merits consideration where the use of traditional municipal corporate or county lines creates extraordinary complications when an effort is made to develop an integrated air pollution program for a metropolitan area. These principles may be described as follows without attempting to describe the steps to be taken in the actual preparation of state or local regulations for the control of air pollution, since these have been well described elsewhere.[2]

A. Definitions

A definition section is an integral part of a comprehensive air pollution statute. This section is important in the administration and interpretation of the statute. Unduly restrictive or vague definitions should be avoided. It is desirable that the definitions be limited to special or new terms or special use of common words. There is no obvious need to include definitions of a large number of scientific terms that are widely used

and accepted in scientific circles. The definition of the term "air pollution" is the most important one in a statute and should be broad enough so that control efforts will protect all the air resources of the state. "Air pollution" may be defined as the presence in the outdoor atmosphere of one or more air contaminants or combinations thereof in such quantities and of such duration that they are or may tend to be injurious to human, plant, or animal life, or property, or unreasonably interfere with the comfortable enjoyment of life or property, or the conduct of business. This language makes it unnecessary to show that life or property already have been injured or that their comfortable enjoyment already has been unreasonably disturbed, so long as the pollution situation is generally known to effect those results. The definition encompasses the preventive and abatement aspects. Similarly, the definition of "person" should not be restrictive, but should include the state, any municipality, county, public or private corporation, partnerships, firm, or other entity or individual.

B. Administrative Agency

The administrative aspect is probably the key to the entire act, since it spells out the means by which the act will be rendered effective. It is in this area that the greatest variations between states and communities might be expected to occur.

1. In legislation which would authorize a state-wide air pollution control program, it is essential that there be a specific designation of an agency responsible for the administration of the program. The problems of air pollution control concern interests other than health. Consequently, the agency established or designated to administer the program should be so constituted as to take into account the interests and views of all affected groups, in addition to public health considerations.

Some states which have recently enacted air pollution control legislation have entrusted its administration to a board or authority, in the state health department, representative of the interests considered to be affected. Such boards are sometimes made up of representatives of various departments of the state government, sometimes of citizens from outside the government, and more frequently, of a combination of the two.[3] The adoption of this procedure has the advantage of facilitating representation of affected interests in the agency. These bodies, among other activities, may promulgate codes, rules, and regulations which are enforced by the state health department or by the body itself.

It may be considered desirable to vest responsibility for the program in a single administrator, such as the state health officer.[3] If this is done, it would seem advisable to provide representation of affected interests through an advisory council. It is desirable, regardless of the type of administrative agency, that the creation and organization of an advisory council should be included in the legislation. Because the council will have technical advisory responsibilities, it is best that its duties be defined in broad terms in the legislation. More specific description of the duties can be developed in the regulations if deemed necessary.

A procedure should be established for appealing administrative orders or asking relief from regulations deemed too restrictive. The constitution and authority of the appeal board should be stated and provision should also be made for appeal from any final order or other final determination of the agency to a court of competent jurisdiction.

Where a state air pollution control agency is to be established in an existing department, it is obviously desirable

that it be placed in a department having competency in terms of experience, personnel, and facilities.

2. Many of the acts confer on the air pollution control agency concerned the requisite administrative powers to carry out its responsibilities. Thus, the agency is empowered to hold hearings, subpoena witnesses, enforce its subpoenas, administer oaths, examine plans and specifications, require the keeping of records and making of reports, promulgate rules and regulations, and enter on property at reasonable times for purposes of inspection and investigation. Procedures of entry and inspection must be described fully. The right of inspection is essential, but inspection procedures should be as reasonable as possible.

C. Air Classification—Air Quality Standards

Some state air pollution control agencies are authorized to divide the state into areas according to prevailing land use with standards of air quality for the designated areas being set in accordance with such use.[3] Classification of areas and establishment of standards are considered by some authorities to be essential elements of any comprehensive program of this type. In other cases the agency may be given broad authority to develop and publish standards for the quality of the air. Such standards are expected to reflect the relationship between the intensity and composition of air pollution and its effect on health, including irritation to the senses, and comfort of human beings, as well as damage to plant and animal life and property, and interference with visibility.

The classification of areas and the promulgation of emission limitations have a definite legal effect and their violation is made unlawful; conversely, discharges which comply with such classification standards are not pollution within the meaning of the statute. In view of the number of persons affected by classifications and standards, the statutes usually require that their adoption be preceded by a public hearing open to all residents of the areas affected, and that adequate notice be given. Such statutes also provide that in the classification of areas, and the establishment of standards, the administrative agency would be guided by the principle of constantly seeking to improve the air quality to the maximum extent practicable.

Many of the state air pollution statutes, other than the type concerned with technical assistance and research, give the responsible agency the power to promulgate implementing rules and regulations for the prevention and abatement of air pollution. In this connection, the enforcement powers are not usually held in abeyance until such action can be completed. All states have some procedural requirements to be observed in the promulgation of rules and regulations. In a growing number of states, largely due to the influence of the provisions of the Federal Administrative Procedure Act, statutes have been adopted establishing certain procedures prior to adoption of regulations by state agencies.[4] Occasionally, the statutes may provide exceptions to these procedures in cases of emergency which may involve the public health, safety, or general welfare.

Standards, codes, rules, and regulations governing the emission of air pollutants should be based on technically accepted criteria. The setting of these standards requires also that consideration be given to local conditions, such as topography, meteorology, industrial development, degree of urbanization, esthetics, and land use planning. Permissible levels of air contaminants should be approached with due consideration to the desires of the area and

the economics involved, especially where health effects are not clearly indicated.

D. Permits—Registration

A permit system provides a technic for the control of air pollution under which prior agency approval of plans, specifications, and other data for new construction or alterations is required. Approval is given only if the controls to be provided are, in the judgment of the agency, adequate to meet the requirements on the emission of air pollutants.

Such approval does not, of course, necessarily guarantee that the completed installation will be efficiently operated or that it will perform in accordance with its design specifications.

There are some, however, who prefer a procedure which requires registration of all sources of regular or anticipated emissions above some minimum size. It should be recognized that a permit program does involve an administrative responsibility of considerable magnitude. The proponents of a registration program believe that knowledge of location and nature of sources of air pollution, with opportunity to inspect, will provide as good a foundation for control as a permit program. It is further claimed that the only advantage of permits over registration is that abatement is simpler by withdrawal of the permit than by petitioning a court for an injunction, an advantage which to some is counterbalanced by the administrative burden of equipment approval. The possible combined use of permit and registration systems might, in certain cases, prove desirable.

E. Enforcement

Statutes now in effect provide a variety of methods for proceeding against any alleged pollutor. It is made unlawful to cause any pollution of the air in the area of jurisdiction in terms of the definition of air pollution, or to violate any order issued by the agency, including an order classifying areas of the jurisdiction or establishing limitations on emission of air pollutants. In some cases, air pollution is declared to be a public nuisance and is therefore subject to abatement in accordance with the practice for abatement of nuisances.

In this connection, the concept is being more generally accepted that the police power of the state and properly authorized local government extends to the regulation of air pollution no matter whether the condition constitutes a common law or statutory nuisance. The validity of a statute or ordinance regulating the emission of pollutants does not depend on whether or not it is in fact a nuisance. Nor does it add to the validity of the legislation to declare that such emission constitutes a public nuisance.

The criteria used to judge the validity of a statute regulating conduct which does not constitute a common law nuisance are those applied to determine the proper exercise of the police power; namely, that the statute is reasonably necessary for the accomplishment of the purpose and for the public welfare, is not unduly oppressive, and does not arbitrarily interfere with private property or impose unnecessary restrictions upon its use.

The violation of the provisions of such statute, or order, or a determination by the agency of failure to perform any duty imposed by the statute is declared to be a misdemeanor. The principal method of making an air pollution control program effective through the compulsory process, however, is by administrative action. The control agency is empowered to issue orders against alleged pollutors after adequate opportunity for hearing. Such orders, if not appealed through the courts, be-

come final and are enforceable in much the same way as a judgment of a court. The same administrative procedure, a hearing, is employed in the case of revocation, denial, or modification of permits.

Many of the statutes provide that appeals may be taken to the courts from orders of the control agency. Such appeals do not generally involve trial de novo, but are primarily reviews of the legal propriety of the agency's decision. If the prescribed statutory procedure has been followed and the determination is supported by substantial evidence, the order of the agency will usually be affirmed by the court. On the other hand, in a trial de novo the court is authorized to exercise its independent judgment on the evidence and to make an independent determination of the reasonableness and legality of action on all issues of law, facts, and mixed questions of law and facts and opinions therein involved.

It should be noted that there is growing support for the view that the test for air pollution as it relates to health should not be limited to conditions which actually or inevitably result in disease or damage, but should include those conditions which create a hazard, danger, or peril to the public health.

F. Severability

A severability clause is usually included to provide that if any part of the statute is declared unconstitutional, the other parts shall continue in force and effect.

More recently enacted state statutes have been of three general types or combinations of these types, i.e.:

I. A law providing for the prevention and abatement of air pollution problems in all areas of the state.

II. A broad enabling act permitting the establishment of air pollution control districts by local option.

III. A law providing for a research and technical assistance program.

1. State Air Pollution Control Legislation

Limited operational experience indicates that such legislation may:

(a) Provide the basis for establishing the organization of the air pollution control agency and for the recruitment of personnel.

(b) Authorize the utilization of personnel and facilities of other state agencies and reimbursement therefor.

(c) Provide the basis on which the agency can plan a comprehensive program taking into account the varying conditions of different areas of the state.

(d) Provide the agency with the authority for the promulgation of rules and regulations based upon needs as determined on the basis of appropriate surveys and hearings before such promulgation.

(e) Provide for the solution of local or regional air pollution problems by authorizing the formation of local and regional air pollution control organizations.

(f) Provide that nothing in the legislation should impair or abridge the power of any local or regional air pollution control agency to promulgate rules and regulations whether they be the same as or more stringent than those promulgated by the state agency.

(g) Authorize the state agency to take action in the absence of, or failure of, a local or regional control agency having jurisdiction to control air pollution, and to resolve interjurisdictional disputes.

(h) Authorize the agency to establish appeal or hearing procedures for cases resulting from direct action of the agency.

(i) Authorize the agency to conduct a research program on air pollution and conduct field studies and investigations related to air pollution as it may deem necessary.

(j) Authorize the agency to collect and disseminate information relating to air pollution and its prevention and control.

(k) Authorize the agency to provide technical assistance and cooperation to local control programs, industry, and other affected groups.

(l) Authorize the agency to receive or initiate complaints and to take the necessary action, after a public hearing, for the abatement of air pollution and establish a penalty for failure to comply with orders of the agency.

(m) Make clear that all causes and effects of air pollution are included within the area of responsibility of the state agency. In addition to health effects, these would include the effects on plant and animal life, on structural material and surfaces, and on visibility, particularly as it affects air and surface transportation.

(n) Authorize the agency to cooperate with appropriate agencies of the United States or other states or any interstate agency or international agency with respect to the control of air pollution.

(o) Authorize the agency to serve as the agency of the state for the acceptance and financial administration of monies from the federal government or other public or private agencies.

II. Local Option Legislation

The effectiveness of local option type legislation is enhanced when the state agency is authorized to take the necessary steps to resolve interjurisdictional air pollution problems. In addition, authority should be granted to the state to deal with those problems beyond the jurisdictional limits of a community. Another provision which has proved useful is the authorization for political subdivisions within the state to enter into agreements or contracts with each other to carry out such functions which might better be performed by them in concert. Interlocal agreement may also be considered for use by communities whether or not they are located within a single state.

Legislation of this type may:

(a) Provide the procedure by which, and conditions under which, a district may be activated and organized involving one or more cities or counties and the formation of metropolitan authorities.

(b) Provide for the names and the general and specific powers of the district.

(c) Provide for an air pollution control board and hearing board for each district and the duties of such boards.

(d) Provide for the appointment, powers, and duties of officers and employees of the district.

(e) Authorize appropriations to the districts by counties and cities comprising such district.

(f) Provide for standards for the control or prohibition of obvious pollution and prohibiting pollution which may be either actually or potentially harmful to persons or property. During an emergency, such as may develop under adverse meteorological conditions, short-time curtailment of community and industrial activities which contribute to pollution may be necessary. Although such an emergency condition is seldom encountered, it is essential that duly constituted governmental authority anticipate such a problem, and be prepared to act through a prearranged procedure.

(g) Provide for injunctive relief against certain violations, and for criminal and civil penalties.

(h) Provide for appeals to appropriate courts on the basis of existing statutes.

III. Research and Technical Assistance Legislation

Legislation of this type usually provides the following:

(a) Authority for the conduct of studies to determine the effects of air pollution upon human, animal and plant life, and upon materials and related matters.

(b) Authority to maintain a laboratory to provide services necessary for the abatement and control of air pollution.

(c) Authority to conduct such research as may be necessary.

(d) Authority to determine by means of study those factors responsible for air pollution.

(e) Authority to develop and maintain a system of monitoring the atmosphere for purposes of determining the presence and quantity of air pollutants.

(f) Authority to assist local and regional agencies by means of cooperative activities and consultation.

(g) Authority to collect and disseminate information relating to air pollution and for the prevention, control, and abatement thereof.

(h) Authority to accept and administer grants from the federal government and other sources, public or private, for carrying out any of the functions indicated above.

Air pollution legislation must have a generally accepted reason for being. The rules of conduct established by the authority, legislation, or custom of a state or community are the basis of our

laws. An essential condition for their being laws in fact, however, is that they are enforced. Unless laws are to be enforced, they should not be enacted. No two states or communities are alike in the extent to which air pollution may constitute a problem of the environment requiring control. If air pollution legislation is required, it should be made to fit the problem and to fit the objectives of the state or local authorities and the people they serve. Any effective law results in disadvantages to some individuals. These disadvantages should be foreseen and weighed against expected benefits and suitable and acceptable compromises should be made in the air pollution legislation which is adopted. Enforcement then should prove to be more readily feasible and result in control of air pollution to the extent necessary to maintain the fitness of the air environment.

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Until 1957, the national infant mortality rate had been decreasing. In 1957, there was an interruption of this trend by a rise in the rate. For this reason a review was undertaken and the findings are presented here. The authors discuss their findings in relation to such factors as population shifts and changing needs.

RECENT TRENDS IN INFANT MORTALITY IN THE UNITED STATES

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FOR THE first time since the mid-1930's, the national infant mortality rate increased from 26.0 in 1956 to 26.3 per 1,000 live births in 1957. The increase among white infants was from 23.2 per 1,000 in 1956 to 23.3 in 1957, and among nonwhite, from 42.1 to 43.7. Rates for 1958 and 1959 showed continued elevation of infant mortality.[24,25] In 1958, the rate increased to 26.9 per 1,000. In 1959, the provisional rate, 26.4 (January-December), was as high as for the year 1955.

Reduction in infant mortality in the United States has been slower in the 1950's than in the decades just preceding. The decrease from 1950 to 1957 has meant that annually for any 100,000 infants born alive, an additional 41 on the average have survived to their first birthday. In contrast, for a similar period in the 1930's (1930-1937), the increased number of survivors per 100,000 live births was on the average about 146 infants annually and during 1940-1947, there were annually some 211 additional infant survivors.

The slower pace in reducing infant mortality in the United States calls for a review of recent trends to identify, if possible, particular areas, or groups of infants, or periods in infancy, where the decrease in rate has lagged or failed to occur. This report summarizes the results of such a review. The findings offer some answers to such general questions as where, among whom, from what causes, and at what ages in infancy has the downward trend of the death rate leveled off notably, or been reversed in recent years.

A relatively detailed picture of recent national trends will, we hope, be of assistance in planning local studies, and in focusing attention where continuing or greater efforts are specially needed if there is to be steady improvement.

On Data and Methods

The recent trends examined are those during the years 1950-1957. To evaluate national trends in mortality rates at detailed ages in infancy during 1950-1957 as a whole, an annual percentage change in rate over these years was estimated for each of the age groups from the regression coefficient in a linear regres-

sion of log rate on the years 1950-1957. Annual per cent change was used also to describe mortality rate trends in metropolitan and in other counties for early and late infancy.* These estimates of annual per cent change in rate were evaluated for statistically significant difference from zero, under the hypothesis of absence of trend during 1950-1957, using the t-distribution in a test of the regression coefficients.

For an indication of trends in infant mortality in each state, the state average annual rate for the period 1954-1957, was compared with the average annual rate for 1950-1953. This procedure was used as well to examine national trends in death rate by cause. Differences in rate between the two periods were tested for statistical significance relative to an hypothesis of a constant probability of death 1950-1957, using chi-square.

All of these examinations of trend by age group, by area, and by cause were carried out by the color group as well.

Asterisks are used in the tables to denote statistical significance of change in rate. One asterisk indicates significance at the 5 per cent level; two asterisks, "highly significant" values at the 1 per cent level.

All data on births and deaths are those published by the National Office of Vital Statistics.[6-25] The numbers of live births and infant deaths registered in the United States (48 states and District of Columbia) in the four-year periods, 1950-1953 and 1954-1957, are shown in the tabulation below, by color and broad-age grouping. Rates for the United States are based on 48 states and District of Columbia.

Infant Mortality Trends by Age

During the period 1950-1957, seven out of ten infant deaths in the United States occurred in the neonatal period (under 28 days). Within the neonatal period, half of the deaths were of infants on their first day of life, and three-fourths were before three days of age. During later months of the first year,

* The expression used was, log $Y = \log \bar{y} + b\,(X - \bar{x})$, where Y is the annual mortality rate in the particular age, color, and county grouping, $\bar{y}$ is the average mortality rate, 1950-1957 in this group, X is year of experience, and $\bar{x}$ the mean year.

	Total	White	Nonwhite
Deaths		Number	
Infant (under 1 year), 1950-1957	862,316	664,986	197,330
1954-1957	433,971	330,497	103,474
1950-1953	428,345	334,489	93,856
Neonatal (under 28 days), 1950-1957	614,454	491,513	122,941
1954-1957	313,822	248,045	65,777
1950-1953	300,632	243,468	57,164
Postneonatal (1-11 months), 1950-1957	247,862	173,473	74,389
1954-1957	120,149	82,452	37,697
1950-1953	127,713	91,021	36,692
Live Births, 1950-1957	31,536,636	27,049,013	4,487,623
1954-1957	16,482,531	14,068,884	2,413,647
1950-1953	15,054,105	12,980,129	2,073,976

Table 1—Infant Mortality Rate, and Average Annual Per cent Change in Rate, by Age, County Group, and Color (United States, 1950-1957)

Total Infants
(By place of residence)

Age and County Group	Rate per 1,000 Live Births								Annual Per cent Change in Rate 1950-1957
	1950	1951	1952	1953	1954	1955	1956	1957	
Infant (under 1 year)	29.2	28.4	28.4	27.8	26.6	26.4	26.0	26.3	−1.7**
Metropolitan	26.4	25.9	26.1	25.8	25.3	25.0	24.9	25.4	−1.3*
Nonmetropolitan	32.6	31.7	31.6	30.5	28.4	28.4	27.6	27.8	−2.7**
Neonatal (under 28 days)	20.5	20.0	19.8	19.6	19.1	19.1	18.9	19.1	−1.1**
Metropolitan	19.8	19.4	19.2	19.1	19.0	19.0	18.9	19.2	−0.5*
Nonmetropolitan	21.4	20.9	20.6	20.1	19.2	19.3	19.0	18.9	−1.9**
Under 1 week	17.9	17.5	17.3	17.2	16.7	16.9	16.5	16.6	−1.1**
Under 3 days	15.3	15.0	14.8	14.7	14.4	14.7	14.4	14.5	−0.7**
Under 1 day	10.2	9.8	9.7	9.7	9.6	10.0	9.9	9.9	−0.1
1 day	3.1	3.1	3.0	3.0	2.9	2.9	2.8	2.8	−1.6**
2 days	2.0	2.1	2.1	2.0	1.9	1.8	1.7	1.8	−2.8**
3-6 days	2.6	2.5	2.5	2.5	2.3	2.2	2.1	2.1	−3.4**
7-27 days	2.6	2.5	2.5	2.4	2.3	2.2	2.3	2.4	−1.7*
Postneonatal (1-11 months)	8.7	8.4	8.6	8.2	7.5	7.3	7.1	7.2	−3.3**
Metropolitan	6.6	6.5	6.9	6.7	6.3	6.0	6.0	6.2	−1.6*
Nonmetropolitan	11.2	10.8	11.0	10.4	9.2	9.1	8.6	8.9	−4.2**
1-5 months	6.0	5.8	6.0	5.8	5.2	5.2	5.0	5.4	−2.4*
6-11 months	2.7	2.5	2.6	2.5	2.2	2.2	1.9	1.9	−5.5**

* Significant at the 5 per cent level.
** "Highly significant" values at the 1 per cent level.

about 70 per cent of the postneonatal deaths (1-11 months) were of infants 1-5 months of age, as compared with some 30 per cent in infants 6-11 months.

Annual death rates, 1950-1957, by detailed age and annual per cent change in rate over these years are shown by color in Tables 1-3. Infant mortality decreased from 29.2 per 1,000 live births in 1950 to 26.3 in 1957, at an annual decrease of 1.7 per cent. This reduction was much slower than in recent preceding periods of comparable length, such as 1943-1950 and 1936-1943.

For these period-comparisons, over-all per cent changes between the first and last year of the seven-year spans are given in Table 4, by age. While the infant mortality rate from 1950 to 1957 was reduced a total of 9.9 per cent, the drop between the years 1943 to 1950 was 27.7 per cent and that between 1936 and 1943, 29.3 per cent. Only at one, two, and from three to six days of age, the seven-year per cent decreases in rate from 1950 to 1957 were larger than those of an earlier period, namely 1943 to 1950.

During the years 1950-1957, annual percentage reduction in neonatal mortality rate was about one-third that of the postneonatal rate, 1.1 per cent as compared with 3.3 per cent for infants 1-11 months of age (see Table 1). The relatively small gains in the neonatal period reflect (a) a more or less stationary rate on the first day of life (under one day) during 1950-1957, and (b) a relatively small annual percentage decrease in neonatal death rate after the first week, 1.7 per cent (7-27 days). Mortality on the first day rose after 1954 and remained elevated.

In the postneonatal period, the annual percentage reduction in mortality rate in the period, 1-5 months was less than half the percentage decrease at 6-11 months. Thus in 1950-1957, the age-specific death rates with the smallest annual percentage reductions were those under a day, one day, 1-3 weeks, and 1-5 months. This pattern was evident in the white group as well as the nonwhite group, but was more marked among the latter. The mortality rate for nonwhite infants on the first day was not stationary during 1950-1957, but rose significantly. The upward trend appears

Table 2—Infant Mortality Rate, and Average Annual Per cent Change in Rate, by Age, County Group, and Color (United States, 1950-1957)

White Infants
(By place of residence)

Age and County Group	Rate per 1,000 Live Births								Annual Per cent Change in Rate 1950-1957
	1950	1951	1952	1953	1954	1955	1956	1957	
Infant (under 1 year)	26.8	25.8	25.5	25.0	23.9	23.6	23.2	23.3	−2.2**
Metropolitan	24.5	23.9	23.9	23.6	23.0	22.6	22.4	22.6	−1.3**
Nonmetropolitan	29.7	28.4	27.7	27.0	25.1	25.0	24.3	24.4	−3.1**
Neonatal (under 28 days)	19.4	18.9	18.5	18.3	17.8	17.7	17.5	17.5	−1.5**
Metropolitan	18.6	18.2	18.0	17.9	17.7	17.5	17.3	17.4	−1.0**
Nonmetropolitan	20.4	19.8	19.2	18.8	18.0	18.1	17.7	17.7	−2.1**
Under 1 week	17.0	16.7	16.3	16.3	15.8	16.0	15.7	15.7	−1.1**
Under 3 days	14.7	14.3	14.1	14.0	13.7	13.9	13.7	13.7	−0.9**
Under 1 day	9.7	9.3	9.2	9.1	9.0	9.3	9.3	9.3	−0.3
1 day	3.0	3.0	2.9	2.9	2.8	2.8	2.7	2.6	−2.0**
2 days	2.0	2.0	2.0	2.0	1.9	1.8	1.7	1.8	−2.3**
3-6 days	2.3	2.4	2.2	2.3	2.1	2.1	2.0	2.0	−2.6**
7-27 days	2.3	2.3	2.1	2.1	1.9	1.8	1.9	1.9	−3.5**
Postneonatal (1-11 months)	7.4	6.9	7.0	6.7	6.1	5.9	5.7	5.8	−4.0**
Metropolitan	5.9	5.7	5.9	5.7	5.3	5.1	5.1	5.2	−2.4**
Nonmetropolitan	9.3	8.6	8.5	8.2	7.1	6.9	6.6	6.7	−5.4**
1-5 months	5.2	4.7	4.8	4.7	4.2	4.2	4.2	4.2	−3.1**
6-11 months	2.3	2.1	2.2	1.9	1.8	1.6	1.6	1.6	−6.0**

** "Highly significant" values at the 1 per cent level.

Table 3—Infant Mortality Rate, and Average Annual Per cent Change in Rate, by Age, County Group, and Color (United States, 1950-1957)

Nonwhite Infants
(By place of residence)

Age and County Group	Rate per 1,000 Live Births								Annual Per cent Change in Rate 1950-1957
	1950	1951	1952	1953	1954	1955	1956	1957	
Infant (under 1 year)	44.5	44.8	47.0	44.7	42.9	42.8	42.1	43.7	−0.9
Metropolitan	40.0	39.9	41.2	39.8	39.4	39.5	39.1	41.3	−0.0
Nonmetropolitan	49.0	50.1	53.6	50.5	47.2	47.2	46.2	47.3	−1.3
Neonatal (under 28 days)	27.5	27.3	28.0	27.4	27.0	27.2	27.0	27.8	−0.1
Metropolitan	28.1	27.5	27.7	27.3	27.5	28.0	27.9	29.1	+0.4
Nonmetropolitan	26.9	27.2	28.4	27.5	26.3	26.1	25.8	25.9	−1.0*
Under 1 week	22.8	22.7	23.0	22.6	22.6	23.1	22.6	23.1	+0.1
Under 3 days	19.0	18.8	19.1	18.8	19.2	19.6	19.5	19.7	+0.6**
Under 1 day	13.0	12.7	12.8	12.9	13.3	13.9	13.7	13.9	+1.4**
1 day	3.7	3.8	3.8	3.6	3.5	3.5	3.5	3.6	−1.1*
2 days	2.3	2.3	2.5	2.3	2.4	2.2	2.3	2.2	−0.8
3-6 days	3.8	3.9	3.9	3.8	3.4	3.5	3.1	3.4	−2.9*
7-27 days	4.8	4.7	5.0	4.7	4.4	4.2	4.3	4.6	−1.6
Postneonatal (1-11 months)	17.0	17.5	19.0	17.3	15.9	15.6	15.1	15.9	−2.3*
Metropolitan	11.9	12.4	13.5	12.5	11.9	11.5	11.2	12.2	−1.0
Nonmetropolitan	22.1	22.9	25.2	23.0	20.9	21.1	20.4	21.4	−1.7
1-5 months	11.8	12.1	13.3	12.4	11.4	11.3	10.9	11.6	−1.5
6-11 months	5.3	5.4	5.7	5.0	4.5	4.3	4.1	4.4	−4.4**

* Significant at the 5 per cent level.
** "Highly significant" values at the 1 per cent level.

to have set in about 1952. Among older nonwhite infants, the rates for 1-3 weeks and for 1-5 months showed minor and doubtful annual percentage decreases. These were about half the size of corresponding percentage decreases for white infants, although the death rates for nonwhite infants were about double those in the white group.

This slower annual reduction of infant mortality in the nonwhite group during 1950-1957 resulted in widening differences in mortality levels between white and nonwhite. By 1957, the neonatal mortality rate of the nonwhite group was 59 per cent higher than in the white group, as compared with 42 per cent higher in 1950. In the postneonatal period, the rate for nonwhite infants in 1957 exceeded the rate for white infants by 174 per cent, while in 1950, it was 130 per cent.

Infant Mortality Trends in Metropolitan and Other Counties

Reduction in infant mortality between the years 1950-1957 proceeded more slowly in metropolitan than in nonmetropolitan counties; 1.3 per cent an-

nually as compared with 2.7 per cent (Table 1). This slow rate of gain was in sharp contrast to the preceding decade, when per cent decrease in infant death rate in metropolitan counties was larger than in nonmetropolitan counties, where mortality levels were higher.

The lag in reducing mortality in the metropolitan counties during 1950-1957 was about equally pronounced in the neonatal and postneonatal periods. The per cent decrease in neonatal death rate annually in metropolitan counties was 0.5 per cent; in nonmetropolitan counties, 1.9 per cent. At age 1-11 months the annual percentage decrease in rate in metropolitan counties was 1.6 per cent, compared to 4.2 per cent in other counties.

The relatively slow pace of reduction was especially marked in the white group. Among nonwhite infants, different trends between the two county groups were clearly evident only in the neonatal period, when the metropolitan rate showed signs of increase while rates for nonmetropolitan counties decreased significantly at 1.0 per cent annually. These opposite trends resulted in higher neonatal rates in metropolitan than in other counties, among nonwhite infants, each year except 1952 and 1953. This excess in mortality of the newborn nonwhite infants in metropolitan counties is in contrast to the general situation for white infants and for older nonwhite infants. For the latter groups metropolitan county rates remained considerably lower than those for nonmetropolitan counties throughout 1950-1957.

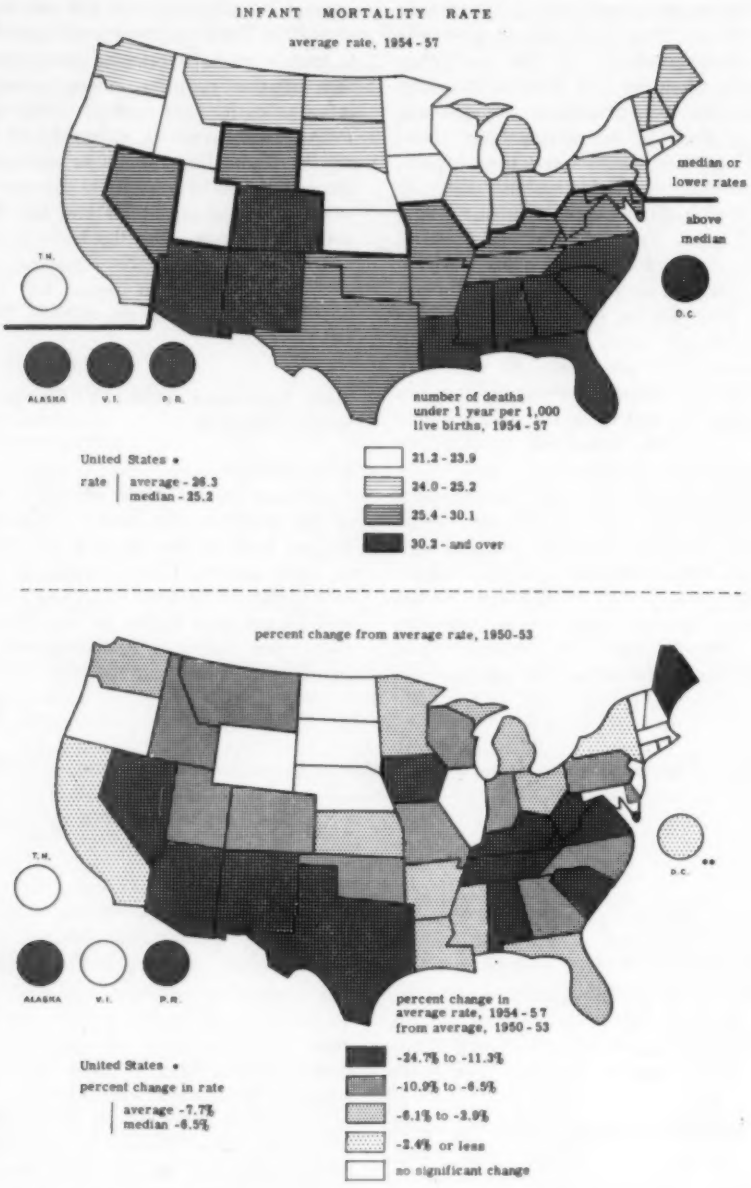
State Experience, 1954-1957 Compared With 1950-1953

Infant Mortality

Average annual infant mortality rates of the states in the period 1954-1957 ranged from a low of 21.2 per 1,000 in Utah and in Iowa to rates 68 per cent higher in Arizona (35.6 per 1,000), and 89 per cent higher in New Mexico (40.1 per 1,000). Rates more than double the lowest rate in Utah and in

Table 4—Infant Mortality Rate, by Age (United States 1936, 1943, 1950, and 1957)

Age	Rate per 1,000 Live Births				Per cent Decrease in the Seven-Year Period		
	1936	1943	1950	1957	1936 to 1943	1943 to 1950	1950 to 1957
Infant (under 1 year)	57.1	40.4	29.2	26.3	−29.3	−27.7	− 9.9
Neonatal (under 28 days)	32.6	24.7	20.5	19.1	−24.2	−17.0	− 6.8
Under 1 week	25.8	19.9	17.9	16.6	−22.9	−10.1	− 7.3
Under 3 days	21.5	16.8	15.3	14.5	−21.9	− 8.9	− 5.2
Under 1 day	15.1	11.6	10.2	9.9	−23.2	−12.1	− 3.0
1 day	3.9	3.2	3.1	2.8	−18.0	− 3.1	− 9.7
2 days	2.5	2.0	2.0	1.8	−20.0	0	−10.0
3-6 days	4.3	3.1	2.6	2.1	−27.9	−16.1	−19.2
7-27 days	6.8	4.7	2.6	2.4	−30.9	−44.7	− 7.7
Postneonatal (1-11 months)	24.5	15.7	8.7	7.2	−35.9	−44.6	−17.3
1-5 months	15.7	10.3	6.0	5.4	−34.4	−41.8	−10.0
6-11 months	8.8	5.1	2.7	1.9	−42.1	−47.1	−29.6



• Forty-eight States and District of Columbia

•• significant increase of 6.2%

Figure 1

Iowa were registered in the Virgin Islands (50.4) and in Puerto Rico (54.7).

The quartile position of the infant mortality rate of each state, 1954-1957, is shown in the upper panel of Figure 1. Rates above median (25.2) prevailed in the southern tier of states, and in the bordering or mountain states of Missouri, Colorado, Wyoming, and Nevada. Maryland was a newcomer in this group, having had, in 1950-1953, a rate no higher than median. Median or lower rates for 1954-1957, characterized the states of the New England, Middle Atlantic, North Central (except Missouri), and Pacific divisions, and the remaining states of the mountain division (Montana, Idaho, Utah). Maine and Montana, which had relatively high rates for 1950-1953, belong in this group in 1954-1957, as a result of above average decrease in their infant mortality rates.

The geographic pattern of relatively high infant mortality rates in states of the southern divisions, as compared with northern and far western divisions was evident throughout the years 1950-1957. However, the differences among divisions were less marked in 1954-1957 than in 1950-1953, and in still earlier years.

Percentage change in infant mortality rate is illustrated in the lower panel of Figure 1. Fifteen jurisdictions showed no significant change in 1954-1957 in infant death rate from average in 1950-1953. With the exception of Wyoming and the Virgin Islands, these were areas with median or lower infant mortality rates for 1950-1953. In the District of Columbia the average infant mortality rate increased 6.2 per cent. In general the largest percentage reductions in rate were in states with higher than median rates in 1950-1953. Iowa, Idaho, Utah, and Wisconsin were exceptional in having substantial percentage reductions of already quite low rates. Despite relatively high infant mortality levels in Mississippi, Louisiana, Florida, and Arkansas, percentage reduction in rate was considerably below average and below the median for the United States.

Neonatal and Postneonatal Mortality of White and of Nonwhite Infants

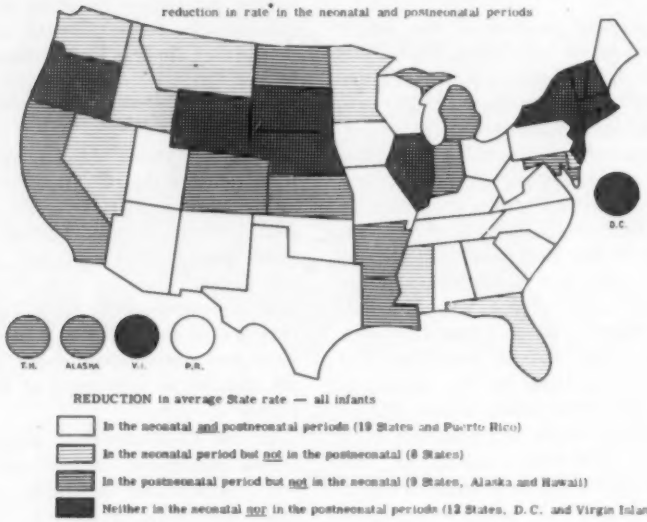
While 35 states, Alaska, and Puerto Rico reduced their average infant mortality rates in 1954-1957 as compared with average for 1950-1953, only 19 states and Puerto Rico had decreased infant death rates in both the neonatal and the postneonatal periods. The experience of the states in reducing neonatal and postneonatal death rates (for all infants) is illustrated at the top of Figure 2.

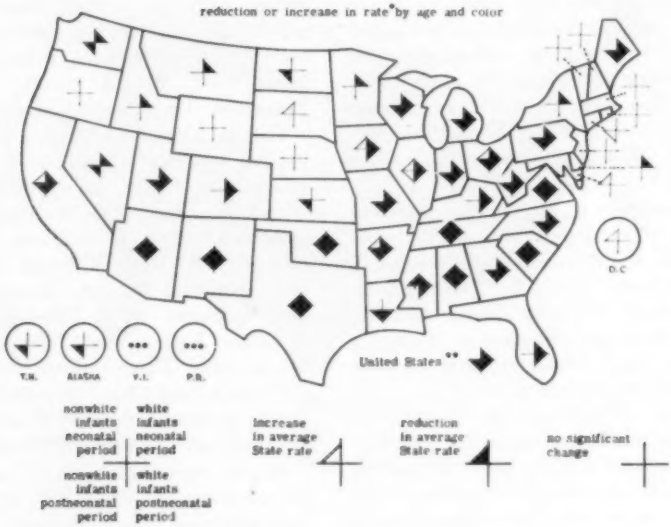
In the lower panel of Figure 2 are shown significant changes in neonatal and postneonatal mortality rates for white and nonwhite infants. Reduction in death rate, early as well as later in infancy, in both white and nonwhite groups, occurred in eight states, all of which had relatively high rates throughout 1950-1957 (Alabama, Arizona, Oklahoma, New Mexico, South Carolina, Tennessee, Texas, and Virginia).

For the United States as a whole the pattern was one of reduction in postneonatal mortality among white and nonwhite infants, while decrease in neonatal mortality was confined to white infants. Ten states followed this pattern (Georgia, Indiana, Maine, Michigan, Missouri, North Carolina, Pennsylvania, Utah, West Virginia, and Wisconsin). Three others (Arkansas, California, and Ohio) deviated in having an increased, instead of unchanged, neonatal rate for nonwhite infants.

In the neonatal period, 17 states or jurisdictions in 1950-1957 appear to have had essentially unchanged or rising mortality levels for both white and nonwhite infants. Included were eight states with more or less stationary age and color-specific rates (Massachusetts,

CHANGE IN INFANT MORTALITY RATE, BY AGE AND COLOR
average State rate, 1954-57, compared with average, 1950-53


reduction in rate* in the neonatal and postneonatal periods
D.C.
T.H.
ALASKA
V.I.
P.R.
REDUCTION in average State rate — all infants
In the neonatal and postneonatal periods (19 States and Puerto Rico)
In the neonatal period but not in the postneonatal (8 States)
In the postneonatal period but not in the neonatal (9 States, Alaska and Hawaii)
Neither in the neonatal nor in the postneonatal periods (12 States, D.C. and Virgin Islands)



* includes statistically significant changes in State rates
** forty-eight States and the District of Columbia
*** data by color not available

Figure 2

Nebraska, New Hampshire, New Jersey, Oregon, Rhode Island, Vermont, and Wyoming); three others were in this category, but with definite increases in the neonatal rate for nonwhite infants (Maryland, South Dakota, and the District of Columbia); Connecticut, which showed no drop in rate for any of the color or age groupings with a significant increase in postneonatal mortality of nonwhite infants; and five other jurisdictions where some gains were made after (but not during) the neonatal period (Louisiana, Kansas, North Dakota, Alaska, and Hawaii).

Postneonatal mortality of white as well as nonwhite infants was not decreased by statistically significant amounts in Delaware, Idaho, Montana, Minnesota, and New York, in addition to the 11 states and District of Columbia, just mentioned, where rates throughout infancy in both color groups were not definitely lower in 1954-1957 than in 1950-1953.

A few states showed reduction of mortality throughout infancy in the white group, but stationary or rising rates for the nonwhite group in postneonatal as well as neonatal periods (Colorado, Florida, Illinois, Iowa, and Kentucky). Washington and Nevada showed gains for white infants in the neonatal period, and for nonwhite infants in the postneonatal period.

Trends in Causes of Infant Death

The United States average annual infant mortality rate for all causes in 1954-1957, 26.3 per 1,000, was 7.7 per cent lower than in 1950-1953. The neonatal rate decreased only 5 per cent (from 20.0 to 19.0 per 1,000) while the rate for the postneonatal period dropped 14.1 per cent (from 8.5 to 7.3 per 1,000). Average annual rates for 1950-1953 and for 1954-1957 are shown in Table 5, by age, color, and broad cause groupings. In this table, cause categories are grouped under the headings, "Prenatal and natal causes," "Postnatal causes," and "Other causes."

Prenatal and Natal Causes—Included under "Prenatal and natal causes" are categories pertaining primarily to conditions arising from factors effective before and/or during birth, for example, conditions such as immaturity, postnatal asphyxia and atelectasis, congenital malformations, birth injury, and the like. Certain diseases of the respiratory system which included hyaline membrane not otherwise specified are also included.* About two-thirds of all infant deaths were from prenatal and natal causes. Nine out of ten deaths from these causes occurred in the neonatal period. In comparison with the other broad cause groups ("Postnatal," "Other causes"), they showed the smallest per cent reduction in infant death rate, namely 4.3 per cent, from 18.6 per 1,000 in 1950-1953 to 17.8 in 1954-1957. While infant death rates decreased for certain causes in this grouping (congenital malformations, birth injuries, and blood dyscrasias), rates increased for postnatal asphyxia and atelectasis, for immaturity with a subsidiary condition, and for the respiratory group including hyaline membrane not otherwise specified. In the nonwhite group, the rate for congenital malformations also increased. Some of the increase in rate for these relatively specific causes was probably due to improved diagnostic reporting on the death certificates. While the rates for these more specific cause categories increased, the rate for the vague category, immaturity unqualified, dropped off from 6.1 to 5.1 per 1,000.

Postnatal Causes—Under "Postnatal causes" (conditions stemming primarily from factors operative after birth) are

* A death for which the certificate reported hyaline membrane with mention of an underlying cause, such as birth injury, pneumonia, immaturity, was counted under the underlying cause.

Table 5—Infant Mortality Rate, by Specified Types of Cause Groups, Color, and Age Group (United States, 1950-1953 and 1954-1957)

Color and Type of Cause Group†	Infant (under 1 year)			Neonatal (under 28 days)			Postneonatal (1-11 months)		
	Average Annual Rate per 1,000 Live Births		Per cent Change 1950-1953 to 1954-1957	Average Annual Rate per 1,000 Live Births		Per cent Change 1950-1953 to 1954-1957	Average Annual Rate per 1,000 Live Births		Per cent Change 1950-1953 to 1954-1957
	1954-1957	1950-1953		1954-1957	1950-1953		1954-1957	1950-1953	
All infants									
All causes	26.3	28.5	− 7.7	19.0	20.0	− 5.0	7.3	8.5	−14.1
Prenatal and natal	17.8	18.6	− 4.3	15.9	16.7	− 4.8	1.9	1.9	0
Postnatal	6.1	6.8	−10.3	1.7	1.6	+ 6.3	4.4	5.2	−15.4
Other	2.5	3.0	−16.7	1.4	1.6	−12.5	1.1	1.4	−21.4
White infants									
All causes	23.5	25.8	− 8.9	17.6	18.8	− 6.4	5.9	7.0	−15.7
Prenatal and natal	17.0	18.0	− 5.6	15.2	16.1	− 5.6	1.8	1.9	− 5.3
Postnatal	4.7	5.5	−14.6	1.4	1.4	0	3.3	4.1	−19.5
Other	1.8	2.3	−21.7	1.1	1.2	− 8.3	0.8	1.0	−20.0
Nonwhite infants									
All causes	42.9	45.3	− 5.3	27.3	27.6	− 1.1	15.6	17.7	−11.9
Prenatal and natal	22.7	22.5	+ 0.9	20.4	20.3	+ 0.5	2.3	2.2	+ 4.5
Postnatal	14.1	15.4	− 8.5	3.6	3.3	+ 9.1	10.6	12.1	−12.4
Other	6.0	7.3	−17.8	3.3	3.9	−15.4	2.8	3.4	−17.7

† In the "Prenatal and natal" grouping of causes are included the following categories of the International Statistical Classification of Diseases, Injuries and Causes of Death (sixth revision), listed here according to size of the corresponding death rates for total infants, 1954-1957: immaturity unqualified (776), postnatal asphyxia and atelectasis (762), congenital malformations (750-759), birth injuries (760-761), blood dyscrasias (770-771), certain other diseases of respiratory system including hyaline membrane, not otherwise specified (511-517, 520, 522-527), immaturity with mention of any other subsidiary condition (774), and congenital syphilis (020).

Inclusions in the "Postnatal" grouping, listed in the same order, are influenza and pneumonia, except pneumonia of newborn (480-493), diseases of the digestive system (530-587), pneumonia of newborn (763), accidents (E-800-E-962), infective and parasitic diseases, except congenital syphilis (001-019, 021-138), diarrhea of newborn (764), and "other infections of newborn" (765-768), diseases of the nervous system and sense organs (330-398), and acute upper respiratory infections, bronchitis, etc. (470-475, 500-510, 518, 519, 521).

The miscellaneous grouping "Other" includes: ill-defined disease peculiar to early infancy (773) and nutritional maladjustment (772), symptoms and ill-defined conditions (780-795), and all other causes (residual).

included the various infective and parasitic diseases, diseases of digestive and nervous systems, and accidents. In 1950-1953, 76 per cent of deaths from postnatal causes were of infants 1-11 months of age; 24 per cent were of infants in the neonatal period. By 1954-1957 the proportion occurring in the neonatal period had increased to 28 per cent, due to rise in the neonatal death rate for these causes from 1.6 per 1,000 to 1.7 per 1,000, while the death rate at 1-11 months decreased by 15 per cent from 5.2 to 4.4 per 1,000. The increase in the neonatal rate for postnatal causes evidently reflected an increase in mortality from "other infections of the newborn" (765-768), not entirely offset by a decrease in the rate for diarrhea of the newborn. In the case of nonwhite infants, the increase in neonatal rate for postnatal causes was attributable to increase in the rates for pneumonia of newborn (from 1.6 to 1.8 per 1,000) as well as for "other infections of newborn" (765-768), from 0.2 to 0.4 per 1,000.

In view of the widespread maternal and child health problem in hospital-acquired staphylococcal disease, a more detailed examination was made of the trends in rates for certain cause categories of infections of unspecified types. Particular categories examined were those for which infant death rates appeared to be on the increase fairly steadily, year after year during 1950-1957, namely, pneumonia of the newborn; acute upper respiratory infection, bronchitis, etc.; meningitis, except meningococcal and tuberculous meningitis; "other infections of newborn" (765-768); and septicemia and pyemia (1-11 months). Numbers of deaths for each of these categories and rates per 100,000 live births in 1954-1957 compared with 1950-1953 are shown by color in Tables 6-8.

In the neonatal period, mortality from "other infections of newborn," (765-768) and from meningitis, except meningococcal and tuberculous, increased significantly among white and nonwhite infants. The neonatal rate among total infants for "other infections of newborn" (765-768) rose 57 per cent from 9.9 to 15.5 per 100,000 on the basis of 1,494 deaths in 1950-1953 and 2,556 in 1954-1957. The meningitis rate increased 43 per cent from 2.8 to 4.0 per 100,000. For the nonwhite group, there was also a significant increase in mortality rate for pneumonia of the newborn, from 162.8 to 182.0 per 100,000.

The rate for septicemia and pyemia in the postneonatal period increased 75 per cent in the nonwhite group from 8.3 to 14.5 per 100,000, while among white infants this rate likewise increased but more slowly (38 per cent) and from a lower rate, 5.2 in 1950-1953 to 7.2 per 100,000 in 1954-1957. Infant mortality from acute upper respiratory infection, bronchitis, and other conditions mentioned, showed a small but significant increase in rate among white infants and the total group.

The slight upward trends of the mortality rates for several of these categories, indicative of infections of unspecified types are in contrast to the substantial reductions made during 1950-1957 in the infant death rates for infective and parasitic diseases as a group; influenza and pneumonia, except of newborn; diarrhea of newborn; and for diseases of the digestive system.

Jointly the selected categories of infections of unspecified types shown in Tables 6-8, accounted for 152 infant deaths per 100,000 live births in 1954-1957, as compared with 137 in 1950-1953. Had the mortality rate for these causes decreased from 1950-1953 to 1954-1957, instead of increased, and by the same proportion as for the rate for infective and parasitic diseases as a group, the lives of about 10,000 infants would have been spared in the latter four year period, or 2,500 annually. This saving of infant life would prob-

Table 6—Infant Mortality from Selected Causes Indicative of Infection of Unspecified Type, by Age and Color (United States, 1950-1953 and 1954-1957)

Total Infants

Selected Causes		Infant (under 1 year)		Neonatal (under 28 days)		Postneonatal (1-11 months)	
		1954-1957	1950-1953	1954-1957	1950-1953	1954-1957	1950-1953
		Rate per 100,000 Live Births					
Pneumonia of newborn	763	81.1	77.1	81.1	77.1	—	—
Acute upper respiratory infection, bronchitis, etc.	470-475, 500-510, 518, 519, 521	29.2**	27.6	—	—	—	—
Meningitis, except meningococcal and tuberculous	340	17.2	16.4	4.0**	2.8	13.2	13.6
Other infections of newborn	765-768	15.8**	10.3	15.5**	9.9	0.3	0.4
Septicemia and pyemia	053	8.3**	5.6	—	—	8.3**	5.6
		Number of Deaths					
Pneumonia of newborn	763	13,363	11,613	13,363	11,613	—	—
Acute upper respiratory infection, bronchitis, etc.	470-475, 500-510, 518, 519, 521	4,818	4,151	—	—	—	—
Meningitis, except meningococcal and tuberculous	340	2,837	2,470	656	429	2,181	2,041
Other infections of newborn	765-768	2,607	1,554	2,556	1,494	51	60
Septicemia and pyemia	053	1,366	849	—	—	1,366	849

** "Highly significant" values at the 1 per cent level.

ably prove to be an under estimate, were the true number of deaths from these infections known. Neonatal deaths from "infections of newborn" (763-768) have been found to be under-reported by some 10 per cent in a recent study in New York City,[4] and by an estimated 50 per cent in another study in Baltimore.[5]

Comment

This review of trends in infant mortality in 1950-1957 shows anew the usefulness of vital record data to provide leads for more intensive study of present problems in maternal and child health.

In 1950-1957, the early age of most infant deaths (seven out of ten in the first month, and half of these before a day of age), their high association with prenatal and natal factors, and the relatively stationary mortality rate, point again to the need for accelerated effort toward improving maternal health.

Much could be accomplished by a wider and more even application of what is known about maternal and infant care, as is evident from the slower pace in 1950-1957 in reducing neonatal mortality in metropolitan counties than elsewhere, the relatively high mortality levels of some states as compared with others, and of nonwhite infants as compared to white.

Well over half of neonatal deaths are of premature infants. Special services for the mothers threatened with premature delivery, and for premature infants, have been shown to increase greatly the infant's chance of survival. Present "know-how" in care of the premature baby if extended nation-wide could reduce neonatal mortality to the level experienced in many widely separated maternity hospitals, namely 13 per 1,000, and would represent a potential national saving of 25,000 neonates annually.[2] The ten-year study at the Colorado Premature Infant Center on prevention of premature delivery, as well as care of premature infants, has shown how prevention and better control of medical and obstetric complications during pregnancy can (a) reduce the incidence of prematurity at the smallest birth weights (under 1,500 grams) and (b) in combination with high quality newborn infant care, reduce by some 30 per cent perinatal mortality among premature infants whose mothers have complications during pregnancy or delivery.[26]

Studies need to be made in states and local communities on specific aspects of changing health needs of mothers and infants, to determine whether needed services are available, whether they are adequate, and what, if any, are the barriers to their use. Health needs in maternity and infancy in many metropolitan areas were greatly altered in 1950-1957 as a result of interregional migration. In these streams of migration during 1950-1958 were almost 1,000,000 nonwhite persons leaving the South for other geographic divisions, going particularly to industrial and commercial centers.[1] Central cities in the 1940's in most regions gained two nonwhite persons for each three white persons who moved to the suburbs. This selective process continued in the 1950's to bring families of newcomers with limited incomes to many of the larger cities of the United States, while families with larger resources moved to the outlying areas.

The finding in this review of increased mortality from certain causes pertaining to infection unspecified as to type, points to a need for epidemiologic studies in hospitals and communities, not only to determine the specific cause of infections, but also the reasons for this increase, including any relationship to hospital-acquired staphylococcal disease. Increase in mortality in the total population (except neonates) of the United States from staphylococcal

Table 7—Infant Mortality from Selected Causes Indicative of Infection of Unspecified Type, by Age and Color (United States, 1950-1953 and 1954-1957)

White Infants

Selected Causes		Infant (under 1 year)		Neonatal (under 28 days)		Postneonatal (1-11 months)	
		1954-1957	1950-1953	1954-1957	1950-1953	1954-1957	1950-1953
		Rate per 100,000 Live Births					
Pneumonia of newborn	763	63.8	63.5	63.8	63.5	—	—
Acute upper respiratory infection, bronchitis, etc.	470-475, 500-510, 518, 519, 521	24.7*	23.5	—	—	—	—
Meningitis, except meningococcal and tuberculous	340	13.5	13.1	3.4**	2.5	10.1	10.6
Other infections of newborn	765-768	12.5**	8.2	12.2**	7.9	0.3	0.3
Septicemia and pyemia	053	7.2**	5.2	—	—	7.2**	5.2
		Number of Deaths					
Pneumonia of newborn	763	8,971	8,236	8,971	8,236	—	—
Acute upper respiratory infection, bronchitis, etc.	470-475, 500-510, 518, 519, 521	3,468	3,044	—	—	—	—
Meningitis, except meningococcal and tuberculous	340	1,900	1,699	473	323	1,427	1,376
Other infections of newborn	765-768	1,753	1,067	1,715	1,025	38	42
Septicemia and pyemia	053	1,015	677	—	—	1,015	677

* Significant at the 5 per cent level.
** "Highly significant" values at the 1 per cent level.

Table 8—Infant Mortality from Selected Causes Indicative of Infection of Unspecified Type, by Age and Color (United States, 1950-1953 and 1954-1957)

Nonwhite Infants

Selected Causes		Infant (under 1 year)		Neonatal (under 28 days)		Postneonatal (1-11 months)	
		1954-1957	1950-1953	1954-1957	1950-1953	1954-1957	1950-1953
		Rate per 100,000 Live Births					
Pneumonia of newborn	763	182.0**	162.8	182.0	162.8	—	—
Acute upper respiratory infection, bronchitis, etc.	470-475, 500-510, 518, 519, 521	55.9	53.4	—	—	—	—
Meningitis, except meningococcal and tuberculous	340	38.8	37.2	7.6**	5.1	31.2	32.1
Other infections of newborn	765-768	35.4**	23.5	34.8**	22.6	0.5	0.9
Septicemia and pyemia	053	14.5	8.3	—	—	14.5**	8.3
		Number of Deaths					
Pneumonia of newborn	763	4,392	3,377	4,392	3,377	—	—
Acute upper respiratory infection, bronchitis, etc.	470-475, 500-510, 518, 519, 521	1,350	1,107	—	—	—	—
Meningitis, except meningococcal and tuberculous	340	937	771	183	106	754	665
Other infections of newborn	765-768	854	487	841	469	13	18
Septicemia and pyemia	053	351	172	—	—	351	172

** "Highly significant" values at the 1 per cent level.

and certain other infections in the period 1949-1957 has been noted.[3]

The failure of the mortality rate on the first day of life to show a significant downward trend during 1950-1957 raises the question of possible effects of more complete reporting of deaths, especially of very small infants. During the 1950's, a number of factors have been favorable to more complete reporting, for example, increase in proportion of births in hospitals, especially in the nonwhite group, and widespread efforts to secure registration of death as well as birth of prematurely born infants, regardless of birth weight, or judgments as to "viability." Specially designed studies in local communities are needed to evaluate such effects, if any.

Summary

1. Because of an interruption of the national downward trend in infant mortality in 1957, trends in infant mortality, 1950-1957, by age and color, in the country as a whole, in metropolitan and other counties, and in the several states, as well as for different types of reported causes of infant death, were reviewed.
2. During 1950-1957, about 70 per cent of infant deaths were in the neonatal period, and of neonatal deaths, half were on the first day. Postneonatal deaths were concentrated at 1-5 months of age, with only 30 per cent occurring at 6-11 months.
3. Annual percentage decrease in infant mortality, 1950-1957, was 1.7 per cent; neonatal mortality, 1.1 per cent; postneonatal, 3.3 per cent. Mortality on the first day did not decrease significantly during 1950-1957, and annual percentage decreases in rates at 1 day, at 1-3 weeks and at 1-5 months were smaller than later in the first week, and at 6-11 months. These tendencies were more pronounced in the nonwhite than in the white group. Nonwhite mortality rate on the first day showed an annual percentage increase (1.4 per cent); their mortality at 1-3 weeks, and at 1-5 months was without definite trend.
4. Annual percentage reduction in infant mortality, 1950-1957, has been smaller in metropolitan counties than in nonmetropolitan, 1.3 per cent annually as compared with 2.7 per cent. The difference was greater for white than nonwhite infants.
5. Average annual infant mortality rates, 1954-1957, in each state were compared with corresponding average rates in 1950-1953 for indications as to trends in state rates. Fifteen states or areas, all but two with rates below or at median, 1950-1953, showed no significant change in rate. In the District of Columbia, the infant mortality rate increased 6.2 per cent.

   In 19 states and Puerto Rico, significant reductions were made in both neonatal and postneonatal mortality.

   Eight states reduced mortality throughout infancy among white as well as nonwhite infants. These were states of the southern divisions where mortality rates were above median. In the United States as a whole, and in 13 states, postneonatal mortality decreased significantly among both white and nonwhite infants, but reduction in the neonatal rate was among white infants only.

   Neonatal mortality levels over the years 1950-1957 remained about the same, or were elevated in 14 states, Alaska, Hawaii, and the District of Columbia. In 11 of the same states, the District of Columbia, and five additional states, postneonatal mortality rates were not significantly lower in 1954-1957 than in 1950-1953.
6. The United States infant mortality rate for all causes decreased 7.7 per cent from an annual average of 28.5 per 1,000 in the period 1950-1953 to 26.3 per 1,000 in 1954-1957. Deaths attributed to prenatal and natal causes comprised two-thirds of all deaths under one year, and in 1954-1957 had the smallest relative decrease in rate, 4.3 per cent from 1950-1953. On the other hand, the infant death rate for cause categories grouped together under postnatal causes decreased 10 per cent between the same periods.
7. Neonatal mortality among all infants from "other infections of the newborn"; from meningitis, except meningococcal and tuberculous; and from pneumonia of the newborn in the nonwhite group showed small increases in rate over the years 1950-1957. Postneonatal mortality from septicemia and pyemia gradually increased in rate during these years.
8. State and community studies of the changing needs of mothers and infants, especially in metropolitan areas, are needed for local interpretation of recent infant mortality trends, and for planning services to insure comprehensive maternity and newborn care for all mothers and infants.

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Here is an analysis of the relationship between perinatal mortality and demographic change. This paper indicates for a specific area some of the factors discussed on a national level in the preceding paper by Hunt and Chenoweth.

POPULATION CHANGES AND PERINATAL MORTALITY

Ella Oppenheimer, M.D., F.A.P.H.A.

THIS paper is concerned specifically with some changes in the characteristics of the population in the District of Columbia and their impact on perinatal mortality and related problems.

The population of the D. C. standard Metropolitan Area (see Map) which embraces the District of Columbia, Montgomery and Prince Georges Counties, Maryland, and Arlington and Fairfax Counties and Alexandria and Falls Church cities in Virginia, like that of other major U. S. Metropolitan Areas has shown a tremendous growth, particularly since the end of World War II, an increase which has occurred almost entirely in the Maryland and Virginia suburbs of Washington. This has occurred both in the white and nonwhite components, but the relative proportion of each has remained essentially unchanged (23 per cent-25 per cent since 1930) (Figure 1).

For the District of Columbia, the small and geographically limited core city of the area, however, the population picture is quite different (Figure 2). With an increase of only 5,000 in population between July, 1950, and July, 1958, the white population which in 1950 represented 65 per cent of the total has declined by 137,000 (26 per cent) and the nonwhite population has increased by 142,000 (48 per cent). Between 1950 and 1958 the percentage of whites in the population of the District declined from 64 to 47, and of nonwhites increased from 36 to 53.

A comparable study of the pattern of births to residents of the Metropolitan Area as a whole, to residents of the District of Columbia and to residents of the area exclusive of the District of Columbia for the period 1950-1957 is of interest (Table 1). During this period the births to residents of the Metropolitan Area as a whole increased by 11,095, 29 per cent; the white births by 6,494, 27 per cent, the nonwhite births by 4,601, 43 per cent. In 1950 the proportion of white births in the total was 72, of nonwhite births 28; in 1957, 69 and 31, respectively. Thus there has been little change in the racial proportion in the area.

However, for D. C. residents, with a slight decrease in total births in 1957 as compared with 1950, the white births decreased by 4,281, 39 per cent, the nonwhite increased by 4,040, 46 per cent. In 1950 the percentage of white births in the total was 56; of nonwhite births 44. By 1957 this had shifted to 35 per cent and 65 per cent, respectively, for white and nonwhite.

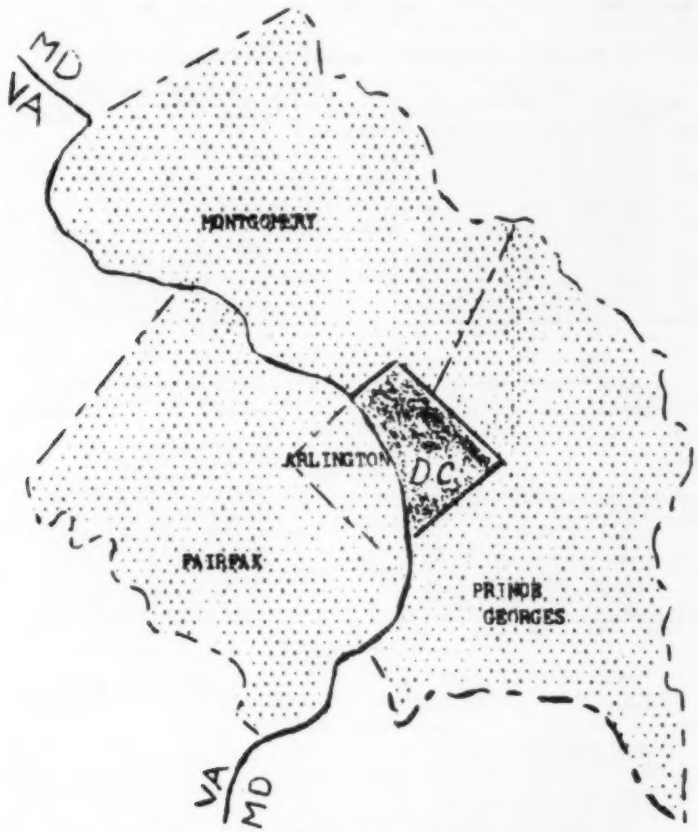
For residents of the area outside of the District of Columbia during this eight-year period the total births have increased by 11,336, 61 per cent; the white births by 10,775, 65 per cent;

nonwhite births by 561, 29 per cent. In 1950 the proportion of white births in the total was 90 per cent; of nonwhite 10 per cent. In 1957 the percentage of white births was 92 per cent; of nonwhite 8 per cent.

The racial pattern of births of residents of the District of Columbia for 1940-1958 is shown graphically in Figure 3. The striking change in the racial pattern following the war and immediate postwar years is apparent.

The marked increase in illegitimate births in the District of Columbia with this change in the racial pattern is also significant (Figure 4). Since 1949 there has been a steady rise from 1,935 to 3,750 in 1958.

Another aspect of the changing picture is the increase in the number of premature births among the nonwhite. Between 1950 and 1958 the total number of premature births has decreased slightly from 2,415 in 1950 to 2,393



DISTRICT OF COLUMBIA METROPOLITAN AREA

Comprises the District of Columbia; Montgomery and Prince Georges Counties in Maryland; Arlington and Fairfax Counties, and Alexandria and Falls Church Cities in Virginia

Figure 1—Metropolitan Washington: Its Population (The Percentage of the Nonwhite Population of the Metropolitan Area Has Not Significantly Changed Since 1930)

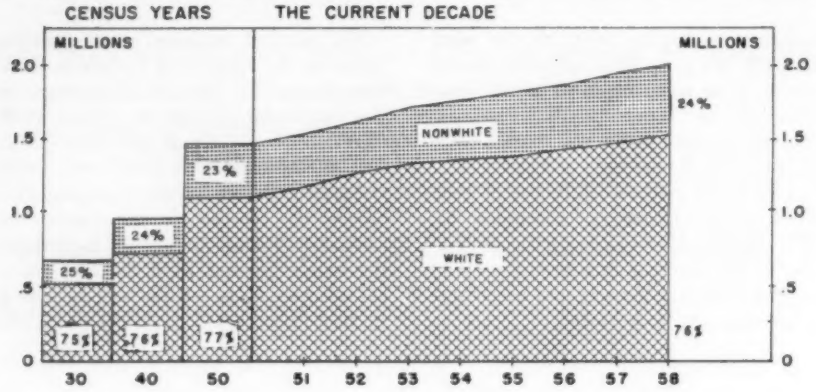
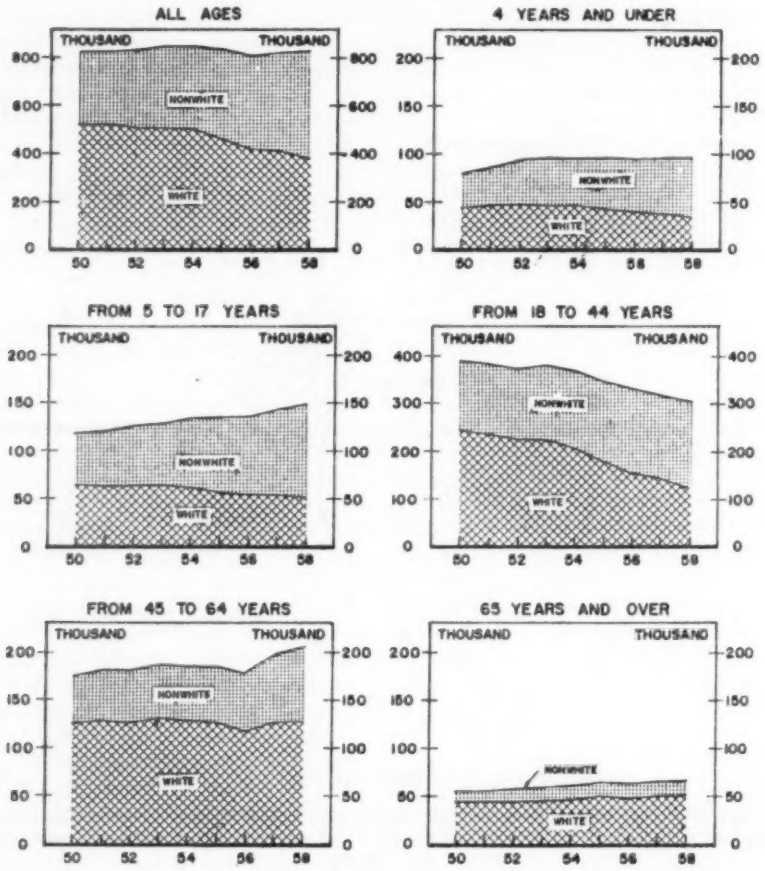


Figure 2—The District's Population: By Age and Color



in 1958. However, the number of premature nonwhite births has grown 47 per cent from 1,255 to 1,842 during this period.

Of paramount significance are the economic characteristics of the population under consideration. A number of fairly recent studies have been made of the economic status of the Metropolitan Area. A recent one made by the Census Bureau for the District of Columbia in 1956 revealed 20.4 per cent of the families in the District of Columbia had incomes below $3,000 a year; 11.6 per cent of the white and 31 per cent of the nonwhite; 46.8 per cent had incomes below $5,000; 30.8 per cent of the white and 66.3 per cent of the nonwhite.

It has been estimated that in 1957 33 per cent of the population as a whole could not pay for hospital care; this applied to 17 per cent of the whites and 53 per cent of the nonwhites. Another study in 1958 by the Board of Trade comparing the District with the Metropolitan Area indicated that the median income for the total area was $6,860; for the District $5,660, and the suburbs $7,940.

Even more indicative of the economic status of the child-bearing population of the District are the proportion of births under private medical care and hospital staff cases. Birth certificate reports for the past several years indicate that approximately 40 per cent of the births to resident mothers in the District are attended by private physicians and 60 per cent are staff cases. For the white births between 18 per cent and 20 per cent were staff cases, while for the nonwhite more than 75 per cent fell in this category. Of the staff cases 30 per cent occur in the city hospital which cares for those dependent upon public care.

Again, although the resident births have changed only slightly between 1950 and 1958, the number occurring at the city hospital have increased by some 23 per cent. In 1958, 6,142 births or more than 30 per cent of 19,546 resident births occurred at that hospital. This represents 4 per cent of the white births and some 47 per cent of the nonwhite births in the city.

Our studies of prenatal care as reported on the birth certificates also point up significant facts. In 1952, 30

Table 1—Live Births to Residents Living in the District of Columbia Metropolitan Area by Residency in the District of Columbia and Residency Outside the District of Columbia and by Race 1950-1957

Year	To Residents Living in the Metropolitan Area			To Residents Living in the District of Columbia			To Residents Living in Area Exclusive of the District of Columbia		
	Total	White	Nonwhite	Total	White	Nonwhite	Total	White	Nonwhite
1950	38,435	27,794	10,641	19,826	11,102	8,724	18,609	16,692	1,917
1951	42,082	30,773	11,309	20,550	11,234	9,316	21,532	19,539	1,993
1952	44,212	32,413	11,799	20,512	10,828	9,684	23,700	21,585	2,115
1953	45,326	32,764	12,562	21,192	10,804	10,388	24,134	21,960	2,174
1954	46,556	33,233	13,323	20,486	9,530	10,956	26,070	23,703	2,367
1955	47,560	33,810	13,750	19,960	8,556	11,404	27,600	25,254	2,346
1956	48,752	33,891	14,861	19,724	7,439	12,285	29,028	26,452	2,576
1957	49,530	34,288	15,242	19,585	6,821	12,764	29,945	27,467	2,478

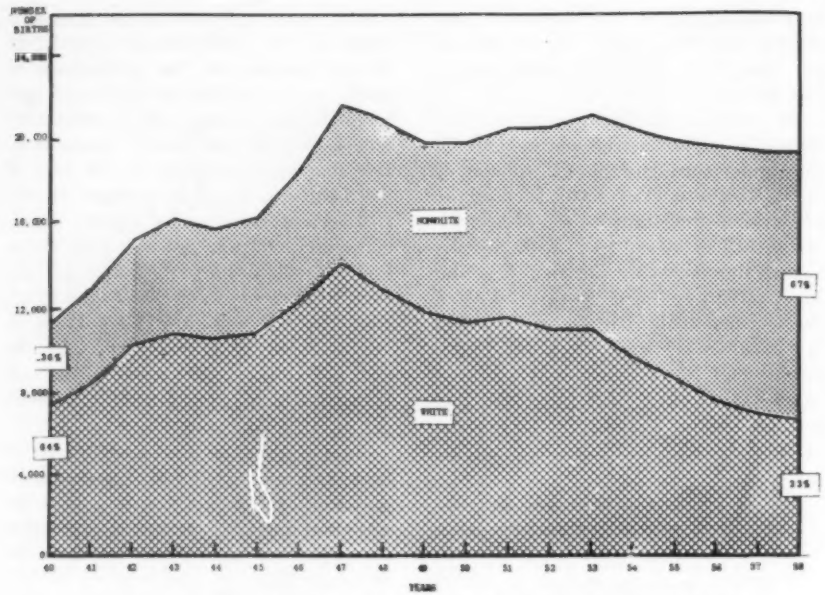


Figure 3—Resident Births by Race: District of Columbia, 1940-1958

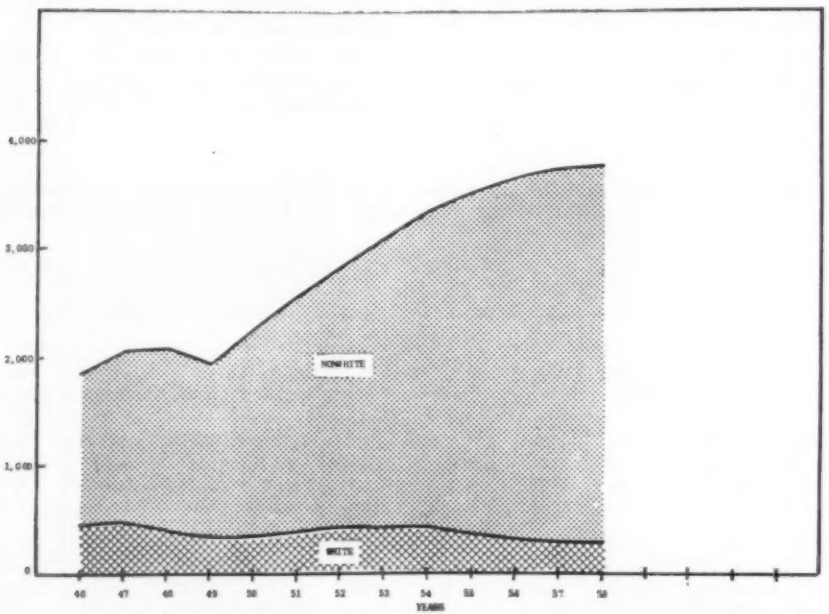


Figure 4—Illegitimate Resident Births by Race: District of Columbia, 1948-1958

per cent of the births at the city hospital were without prenatal care; in 1956 for those born at the city hospital the percentage without prenatal care had increased to 47 per cent, and has remained at that level in 1957 and 1958. A breakdown by place of occurrence of the births without prenatal care in 1957 revealed that 84 per cent of all births without prenatal care occurred at the city hospital (70 per cent of the white, 85 per cent of the nonwhite), 7 per cent occurred at one other hospital, 5 per cent in 13 other hospitals, and 4 per cent not in a hospital.

Now for a picture of perinatal mortality. Comparing perinatal mortality for the Metropolitan Area and the District of Columbia, and the Metropolitan Area exclusive of the District of Columbia, for the years 1950-1957 (Table 2) the excess mortality of the District of Columbia as compared with the Metropolitan Area as a whole and the area exclusive of the District of Columbia is apparent. The nonwhite mortality of the area, as would be expected, is essentially the same as for the District, but it is of interest that in all but two of the eight years the white mortality of the District is consistently higher than of the area.

For the District of Columbia, perinatal mortality has shown little change for the period between 1950 and 1958 (Figure 5). However, breaking the perinatal mortality into its components, we find that the fetal death ratio has shown a decline particularly in the nonwhite during this period (Figure 6), which has been offset by increases in the neonatal period, with the neonatal rate registering an increase of 22 per cent between 1950 and 1958, the white unchanged, and the nonwhite increased by 42 per cent (Figures 7, 8, 9).

The major problem, therefore, centers around the high and increasing neonatal mortality among the nonwhite portion of the population.

With 84 per cent of the births with no prenatal care occurring at the city hospital, a comparison of the neonatal death rate of infants born at that hospital in 1956, with and without prenatal care, is of interest. The neonatal mortality for those with prenatal care was 23.7, for those without prenatal care, 41.6. In the city as a whole during that year the neonatal death rate was 23.9, for the nonwhite 28.9.

The relationship of premature birth to neonatal mortality needs no discussion here. Our recent data again con-

Table 2—Perinatal Mortality, District of Columbia Metropolitan Area: by Area, District of Columbia, and Area Exclusive of District of Columbia and by Race, 1950-1957 (Fetal Deaths 20 Weeks Gestation and Over and Infant Deaths 28 Days and Under, per 1,000 Births)

Year	District of Columbia Metropolitan Area			District of Columbia			Area Exclusive of District of Columbia		
	Total	White	Nonwhite	Total	White	Nonwhite	Total	White	Nonwhite
1950	36.5	32.4	47.1	43.3	40.3	47.1	29.2	33.1	46.9
1951	36.1	31.5	48.6	42.1	35.8	49.6	30.4	29.0	44.6
1952	37.5	32.3	52.0	46.7	40.1	54.1	29.6	28.4	42.1
1953	36.3	30.8	50.5	43.1	36.1	50.4	30.2	28.9	46.5
1954	36.2	32.0	46.7	43.4	36.6	49.4	30.5	30.1	34.2
1955	38.6	32.2	54.4	44.3	31.2	54.2	34.5	32.5	55.4
1956	35.6	29.2	50.0	42.5	29.1	50.6	30.9	29.3	47.4
1957	36.5	30.5	49.9	44.4	35.2	49.3	31.3	29.3	52.9

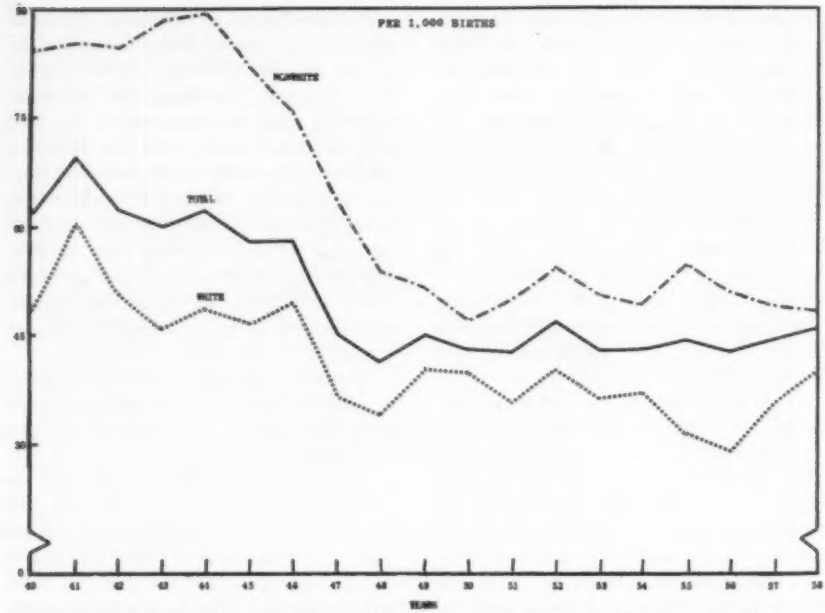


Figure 5—Perinatal Mortality by Race: District of Columbia, 1940-1958 (Fetal Deaths 20 Weeks Gestation and Over and Infant Deaths 28 Days and Under)

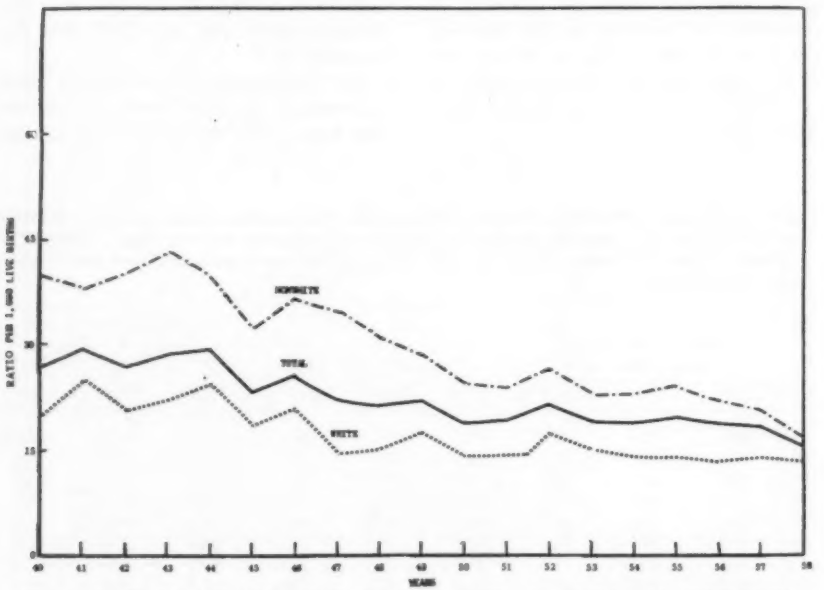


Figure 6—Resident Fetal Death Ratios by Race: District of Columbia, 1940-1958

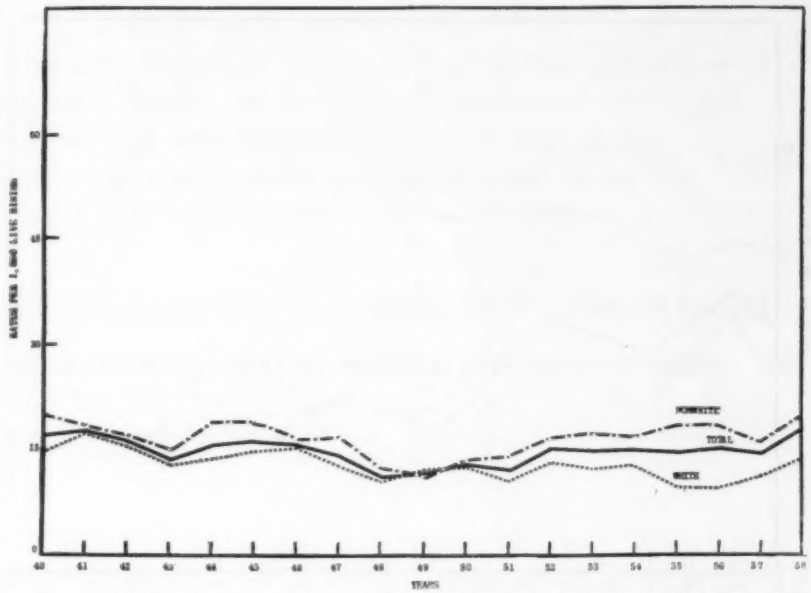


Figure 7—Resident Infant Death Rates—Under One Day by Race: District of Columbia, 1940-1958

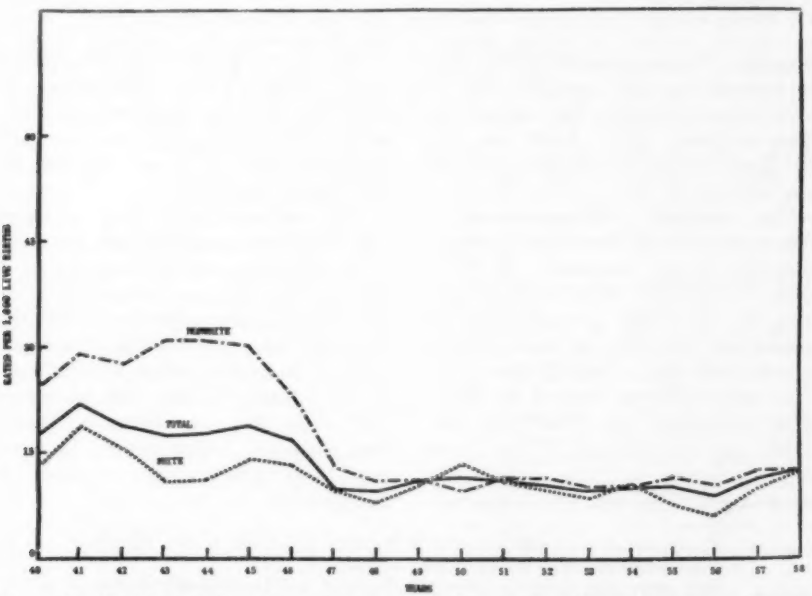


Figure 8—Resident Infant Death Rates—One Day to One Month by Race: District of Columbia, 1940-1958

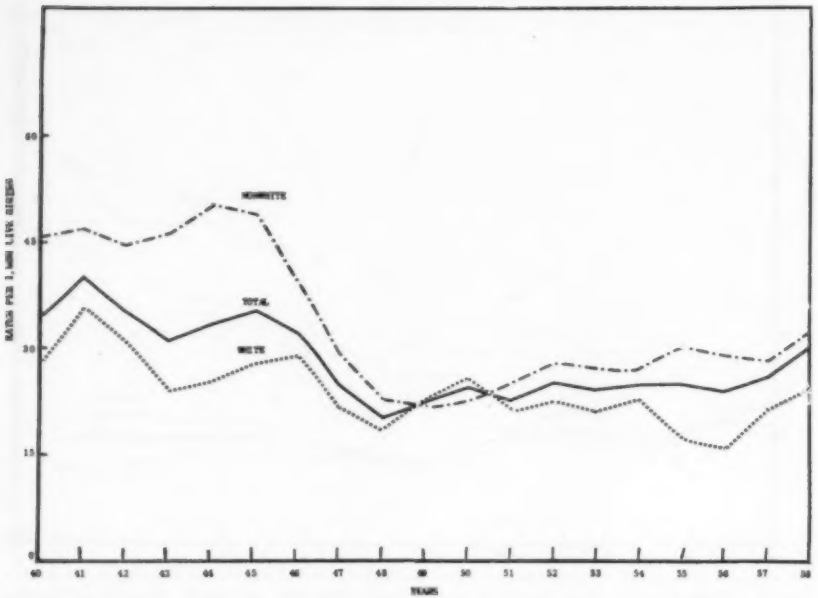


Figure 9—Resident Infant Death Rates—Under One Month by Race: District of Columbia, 1940-1958

firm this. For the years 1955-1957, with an over-all neonatal mortality rate of 19.8 for single births, the rate for infants weighing under 2,500 gm was 141.4 and for those weighing over 2,500 gm, 5.9.

The relationship of prematurity to prenatal care in the District o Columbia continues to be confirmed. In 1957, with 12.2 per cent of the births premature, for those with prenatal care the percentage was 10.2; for those without prenatal care 21.5. In 1958 there is the same story—12.5 per cent of the births were premature, for those with prenatal care 10.4 per cent of the births were premature, for those without prenatal care 22.7 per cent were premature.

The large number of illegitimate births is also a factor in the picture. In 1957, 13.2 per cent of the legitimate live births without prenatal care must be compared with 41.2 per cent of the illegitimate births.

The implications of these scattered but, I believe, significant data are clear. Program action has not kept pace with the need for services brought about by the changing population in the District of Columbia, with its high proportion of those in need of public services.

The situation is now well recognized and steps are being taken to remedy the situation; unfortunately, however, the loss which has occurred is irretrievable.

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This paper was presented before the Maternal and Child Health Section of the American Public Health Association at the Eighty-Seventh Annual Meeting in Atlantic City, N. J., October 19, 1959.

This study of neonatal mortality in a specific city took its point of departure from the rise in infant mortality noted in 1957. It is significant to note that epidemiological analysis in this community points to several responsible factors including several related to the hospital and the case management.

AN EPIDEMIOLOGICAL APPROACH TO THE PROBLEM OF RISING NEONATAL MORTALITY IN BALTIMORE

Kathleen Carney Buetow, M.D., Dr.P.H.

ONE of the great advances in the field of medical science in the past 50 years has been the remarkable decline in infant, including neonatal, mortality rates. By 1955, the neonatal mortality rate in the United States had reached a low of 19 per 1,000 live births.[1]

Statistics are available to show the experience in the city of Baltimore among the resident births since 1935 (see Figure 1, graph). These figures indicate that the neonatal mortality rate has shown a rather steady decline, punctuated by occasional rises, the latter always more marked among the Negro infants. The most recent rise occurred in 1957 when the neonatal mortality rate for resident births in Baltimore rose from a level of 22 per 1,000 live births in the previous year to 26 per 1,000, a difference significant at the 1 per cent level. This was characterized by a rise in the white rate from 18 to 19 per 1,000 and a rise in the Negro rate from 27 to 36 per 1,000 live births.[2] This elevation has persisted to some degree through the first six months of 1959.[3]

Confronted with this statistically significant rise in infant mortality, accounting for an excess of 118 neonatal deaths in 1957, the Research and Planning Section of the Baltimore City Health Department issued a special statistical report in January, 1958, concerned with the problems of neonatal mortality in the city in 1957. They established the following points:[4]

1. This trend was limited to the neonatal period. The death rate per 1,000 live births for infants aged 28 days through 11 months remained almost stationary, and there was also no parallel rise in fetal deaths.
2. Primarily this was a problem of the Negro infant.
3. The increase in the actual number of deaths was most marked at 24 hours through six days of age. There was no rise in natal day mortality rates.
4. In 94 per cent of instances, the neonatal death occurred prior to the infant's initial discharge from the hospital of birth.
5. Although there was a rise in the weight specific death rates for all groups studied, the percentage weight distribution of the births did not vary significantly from that observed in preceding years.
6. This rise in neonatal mortality was not uniformly observed in all the hospitals in the city.

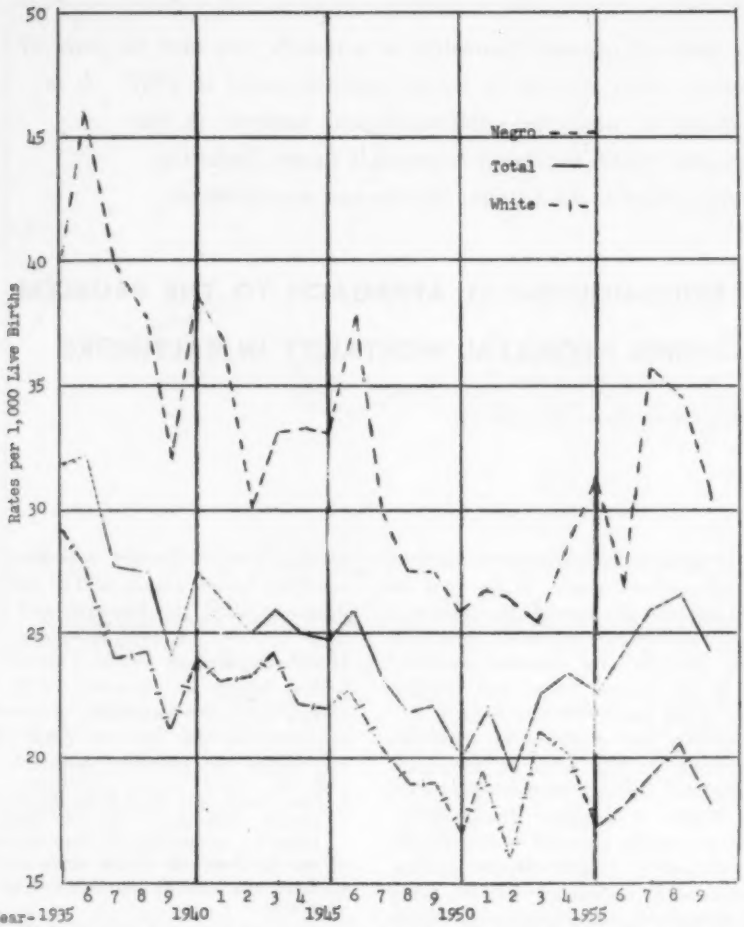

Figure 1—Neonatal Death Rates per 1,000 Live Births in Baltimore City, 1935-1959, by Race (1959 Figures for First Six Months Only)

Method

When it became apparent that this rise was persisting during 1958, the present epidemiological investigation was initiated. Briefly the method of this analysis consisted in:

1. A study of the neonatal mortality in certain hospitals showing this rise and representing better than 50 per cent of the nonwhite resident deliveries, looking for conditions which showed a statistically significant association with mortality and which would indicate "leads" worthy of further investigation.
2. An analysis of those factors found to be associated with neonatal mortality to determine if there was a change in incidence rates of such conditions when compared with a control period.

The investigation was carried out within two large teaching hospitals in the city, where adequate newborn records were available and where autopsy permission was secured on 90 per cent or more of the neonatal deaths. Analysis of the factors possibly related to high neonatal mortality was divided into three phases:

1. Factors present at the onset of pregnancy.
2. Factors present during pregnancy, labor, and delivery.
3. Factors affecting the child after delivery.

Subtopics included in these various groups may be noted in Table 1.

At both hospitals the obstetrical records of all mothers experiencing live birth in the first four months of 1958 were analyzed and compared with control periods in 1956, the most recent year of significantly lower neonatal mortality. In addition all the recorded neonatal deaths occurring at these hospitals during the first nine months of 1958 were studied in detail, including evaluation of all available necropsy data. Information for control data was available only for certain specified periods, accounting for seasonal differences in the comparisons. However, it was determined by investigating the Baltimore city resident monthly mortality rates over a five year span (1953-1957), that although there was some variation in neonatal mortality rates according to the time of the year, these fluctuations did not affect the comparisons made in the paper because of the particular combinations of months that were used.

Findings

Hospital A is the municipal hospital in which nearly 40 per cent of all Baltimore Negro babies are born. Negro patients comprise 85 per cent of the obstetrical case load. Problems of overcrowding and understaffing, as a result of a greatly increased volume of deliveries in recent years, are apparent on both the obstetrical and nursery services and are of concern to the authorities involved.

Table 2 shows the neonatal mortality situation at Hospital A during the study time as compared with the control period, indicating a significant rise in the death rate of Negro infants. Further analysis of the conditions associated with neonatal mortality yielded several factors worthy of consideration here.

Table 1—Topics Considered in the Analyses of Factors Possibly Influencing Neonatal Mortality Rates

Group A. Factors Present at Onset of Pregnancy

1. Race
2. Age of mother
3. Marital status of mother
4. Result of previous pregnancies
5. Complications of previous pregnancies
6. Socioeconomic status

Group B. Factors Present During Pregnancy, Labor, and Delivery

1. Prenatal care
2. Complications prior to onset of labor
3. Condition of the mother on admission
4. Onset and duration of labor
5. Duration of rupture of membranes
6. Labor complications
7. Management of delivery
8. Third stage of labor
9. Analgesia and anesthesia
10. Puerperium

Group C. Factors Present in the Lives of Infants Experiencing Neonatal Death

1. Weight of infant
2. Sex of infant
3. Condition at birth
4. Status at initial examination
5. Administration of oxygen
6. Time of onset of symptoms of terminal illness
7. Use of antibiotics
8. Age of infant at death
9. Results of cultures
10. Clinical cause of death
11. Autopsy findings
12. Presumed cause of death
13. Evidence of infection as cause of death

Table 2—Hospital A: Neonatal Mortality Rate Among All Obstetrical Discharges After Live Birth, Race Specific

Time	Race	Live Births	Neonatal Deaths	Neonatal Death Rate/1,000
July 1-December 31, 1956	White	318	10	31*
	Negro	2,155	48	22†
	Total	2,473	58	23‡
January 1-September 30, 1958	White	491	24	49*
	Negro	3,429	107	31†
	Total	3,920	131	33‡

* Differences between white neonatal deaths 1956 and 1958 are not significant.
† Differences between Negro neonatal deaths 1956 and 1958 are significant, P less than 0.05.
‡ Differences between total neonatal deaths 1956 and 1958 are significant, P less than 0.05.

Table 3—Hospital A: Incidence of Prenatal Care Among Mothers Discharged After Live Birth, January-April, 1958, Related to the Outcome of the Current Pregnancy, Race, and Weight of the Infant

Race	Birth Weight	Care Status	Live Births	Neonatal Deaths	Neonatal Death Rate/1,000
White	Less than 1,000 gm	Care*	0	—	—
		No care*	3	3	1,000
		Total	3	3	1,000
	1,001-2,500 gm	Care	3	—	0
		No care	21	4	190
		Total	24	4	167
	2,501 gm and over	Care	61	1	16
		No care	114	2	17
		Total	175	3	17
	Totals	Care	64	1	16
		No care	138	9	65
		Total	202	10	49
Negro	Less than 1,000 gm	Care	4	4	1,000
		No care	4	4	1,000
		Total	8	8	1,000
	1,001-2,500 gm	Care	85	8	94
		No care	115	19	165
		Total	200	27	135
	2,501 gm and over	Care	689	6	9
		No care	480	3	6
		Total	1,169	9	8
	Totals	Care	778	18	22
		No care	599	26	43
		Total	1,377	44	32

* "Care" means one or more visits to a Prenatal Clinic at any time during the pregnancy. "No care" means no visits to a Prenatal Clinic.

I. Influence of Prenatal Care

Although prenatal care is available through the Baltimore City Health Department to all who need and request it, many mothers arrive at this hospital in labor without the benefit of any prior care. Table 3 presents data concerning the prenatal care status and neonatal mortality. Examination of this material indicates that patients having no prenatal care have significantly higher neonatal mortality rates; for total Negro deliveries, P is less than 0.05. When only infants in the 1,001-2,500-gm category are considered, trends, but not statistically significant differences, are noted among both races in the direction of relating the lack of prenatal care to mortality in the neonatal period. Combinations of the races, however, give a P less than 0.10 and suggest that when adequate numbers of patients are available, the differences noted may be important ones. In babies over 2,500 gm no significant correlation was noted among the neonatal deaths and the incidence of prenatal care.

It may be observed that the number of cases having prenatal care increases with the weight of the baby. With information currently available, it is not possible to state whether this fact is due to prevention of prematurity by giving adequate prenatal care, or due to the tendency of mothers to fail to seek prenatal care until nearly the expected date of confinement.

The proportion of mothers receiving prenatal care during the study period as compared with the control period is shown in Table 4. Examination of the differences noted in this table reveals that the increase in lack of prenatal care noted for the white patients in 1958 could easily be a chance variation. However, for Negro patients there has been a significant increase in failure to obtain prenatal care as offered by the City Health Department. Before leaving this issue it is important to point out that this failure to seek prenatal care was not a consequence of an increase in the rate of premature deliveries. The percentage weight distribution of births, calculated in 500-gm categories, did not vary significantly from that noted in the control period. Thus it appears that the current increase in the number of patients who failed to obtain prenatal care may be directly related to the rise in neonatal mortality.

Table 4—Hospital A: Comparison of the Prenatal Care Status of All Obstetric Discharges After Delivery, July-December, 1956, and All Obstetric Discharges After Live Birth, January-April, 1958

Race	Year	Total Patients	Number Without Care	Per cent Without Care
White	1956	325	206	63.3
	1958	202	138	68.3
	Total	527	344	65.3
Negro	1956	2,186	830	38.0
	1958	1,385	602	43.5
	Total	3,571	1,432	40.1

Difference is not significant for white, P is less than 0.01 for Negro.

Table 5—Hospital A: The Incidence of Puerperal Fever, Its Etiology and Relation to Neonatal Mortality Among Mothers Discharged After Live Birth, January-April, 1958

Condition	Negro			White		
	Live Birth	Neonatal Death	Neonatal Death Rate/1,000	Live Birth	Neonatal Death	Neonatal Death Rate/1,000
Afebrile	1,120	31	28	166	9	54
Puerperal morbidity						
Endometritis	44	3	68	3	0	0
Mastitis	8	0	0	1	0	0
Other genital infection	6	0	0	1	0	0
Urinary infection	31	2	74	7	0	0
Infectious abdominal wound	1	0	0	0	0	0
Sepsis or peritonitis	0	0	0	0	0	0
Intercurrent disease	7	1	143	1	0	0
Cause unknown	53	3	57	8	0	0
One-day fever	116	5	43	17	1	59
Information unknown	6	0	0	1	0	0
Total with puerperal morbidity	259*	14	54†	35*	1	29‡
Total patients	1,385	45	33	202	10	50

* In ten instances (seven Negro and three white) patients are reported as having more than one diagnosis.
† When compared to afebrile Negro patients, P is less than 0.05.
‡ When compared to afebrile white patients, difference is not significant.

Table 6—Hospital A: Comparison of the Incidence of Puerperal Morbidity (Characterized by Any Febrile Reaction in Postpartum Period, Exclusive of the First 24 Hours) Between All Obstetric Discharges After Delivery July-December, 1956, and All Discharges After Live Birth January-April, 1958

Year	Race	Number of Patients	Number with Puerperal Morbidity	Rate of Morbidity/ 100 Patients
1956	White	325	42	13.1*
	Negro	2,186	329	15.1†
	Total	2,511	371	14.7
1958	White	202	35	17.3*
	Negro	1,385	259	18.7†
	Total	1,587	294	18.5‡

* Difference between white puerperal morbidity rates 1956-1958 are not significant.
† Difference between Negro puerperal morbidity rates 1956-1958 are significant, P less than 0.01.
‡ Difference between total puerperal morbidity rates 1956-1958 are significant, P less than 0.01.

Table 7—Hospital A: Per cent of Patients Having Onset of Symptoms of Terminal Illness at Specified Time Among All Neonatal Deaths July-December, 1956, and January-September, 1958

Birth Weight	Total Patients	Time of Onset of Symptoms of Terminal Illness: First 24 hr	Day 1	Day 2-4	Day 5-7	Day 8-27	Total Per cent
Less than 1,000 gm							
1956	22	95.4	0	0	0	4.6	100.0
1958	34	100.0	0	0	0	0	100.0
1,000-2,500 gm							
1956	30	86.7	0	3.3	0	10.0	100.0
1958	66	57.6	6.1	25.8	9.1	1.5	100.0
Over 2,500 gm							
1956	7	42.8	25.5	0	14.3	14.3	99.9
1958	31	54.8	0	32.0	3.2	9.6	99.6

Only difference of significance noted was in the 1,000-2,500 gram infants, P less than 0.01.

Table 8—Hospital A: Neonatal Life Tables, July-December, 1956, and January-September, 1958, Premature Infants (1,001-2,500 gm) and Mature Infants (over 2,500 gm)

	1956			1958		
	Number Alive at Onset of Interval	Number of Deaths	Death Rate/1,000 at Risk	Number Alive at Onset of Interval	Number of Deaths	Death Rate/1,000 at Risk
	Premature (1,001-2,500 gm) Infants					
First 24 hours	318	19	60	530	14	26
Day 1	299	3	10	516	5	10
2	296	1	3	511	6	12
3	295	0	0	505	9	18
4	295	1	3	496	6	12
5-6	294	1	3	490	11	22
7-13	293	2	7	479	16	33
14-20	291	2	7	463	2	4
21-27	289	1	3	461	1	2
28	288	—	—	460	—	—
	Mature (over 2,500 gm) Infants					
First 24 hours	2,136	2	1	3,361	8	2
Day 1	2,134	0	0	3,353	0	0
2	2,134	2	1	3,353	0	0
3	2,132	0	0	3,353	4	1
4	2,132	1	0.5	3,349	7	2
5-6	2,131	0	0	3,342	6	2
7-13	2,131	0	0	3,336	4	1
14-20	2,131	2	1	3,332	1	0.3
21-27	2,129	0	0	3,331	1	0.3
28	2,129	—	—	3,330	—	—

Table 9—Hospital A: Comparison of Types of Antibiotics Administered to Infants Surviving the First 24 Hours, but Dying in the Neonatal Period, July-December, 1956, and January-September, 1958

Birth Weight	Total* Patients	None	Type of Antibiotic Administered									
			Penicillin	Streptomycin	Tetracycline	Chloramphenicol		Erythromycin	Polymyxin	Albamycin	Unknown Antibiotic
						Dosage of 50 mgm/kgm or Less	Dosage in Excess of 50 mgm/kgm				
Less than 1,000 gm											
1956	8	3	2	2	1	2	3	0	1	0	0
1958	6	3	1	0	0	0	2	0	0	0	1
1,000-2,500 gm											
1956	11	0	8	7	2	3	3	0	0	0	0
1958	52	6	23	2†	3	0	40†	4	1	1	4
2,500 and over											
1956	5	1	2	1	0	0	2	0	0	0	0
1958	23	5	10	1	0	2	12	2	1	1	2

* Many infants received more than one drug. † Indicates a significant difference, P less than 0.01.

2. Influence of Maternal Postpartum Infection

The incidence and etiology of fever in the postpartum period was correlated with the neonatal outcome, as is shown in Tables 5 and 6. The higher neonatal mortality rates observed in Negro infants whose mothers had fever in the puerperal period are statistically significant, P is less than 0.05. It is also important to note that the higher incidence of puerperal morbidity among Negro patients during the study period as compared with the control era is statistically significant, P less than 0.01, Table 7. Additional data suggested that this rise in Negro maternal morbidity was due to significant increases (P less than 0.01) in the incidence of "one-day fever" and "other, unspecified causes" of postpartum fever, and not to any increased incidence in the diagnosis of endometritis. These facts lead to the hypothesis that during 1958, as compared to the control period, there was possibly present in the obstetric department or the community an unfavorable agent (perhaps bacterial, viral, or other) which produced a febrile reaction in certain mothers in the postpartum period, and may have been responsible for the neonatal death of some of their infants. Such an agent was not detectable by routine laboratory studies performed on febrile mothers.

3. Influence of Postnatal Factors

Evaluation of the course of life, as well as laboratory and autopsy findings of all neonatal deaths during the first nine months of 1958, and during a control period in 1956, indicated that differences of statistical significance were found principally in the premature (1,001-2,500 gm) infants, although similar trends were frequently observed among the more mature babies. These differences suggest that in 1958, there may have been an agent (possibly infectious, or drug, or environmental) active in the postnatal period which

was responsible for at least a portion of the excess neonatal deaths. This conclusion was based upon the following observations:

a. Premature infants dying in 1958 showed less incidence of respiratory distress at the time of initial examination than similar infants dying in 1956, P less than 0.01.
b. These infants were older at the time of onset of symptoms of terminal illness and at the time of death than the control infants—in both instances the value of P for the observed difference was less than 0.01. These data are presented in Tables 7 and 8.
c. Premature infants dying in 1958 also more frequently showed respiratory pathology at autopsy than their controls.
d. These infants also showed interesting differences in the pattern of antibiotic administration, as compared with controls—this information is presented in Table 9. Since it was felt that death within the first 24 hours of life was in most instances independent of antibiotic therapy, the administration of these drugs to infants surviving at least 24 hours was considered. No significant differences were noted between the per cent of such infants receiving antibiotic therapy in 1958 compared with 1956. When the various types of antibiotics ad-

Table 10—Hospital A: Neonatal Mortality Rates of All Liveborn Infants Weighing 1,501-2,500 gm July-December, 1958, and January-June, 1959; Dosage of Chloramphenicol Was Reduced from an Average of 100 mgm/kgm/24 Hours to Less Than 25 mgm/kgm/24 Hours in January, 1959

Time	Total Births	Lived	Died	Death Rate/1,000 Live Births
July-December, 1958	342	307	35	102*
January-June, 1959	368	350	18	49*
Total	710	657	53	74

* This difference is significant, P less than 0.01.

Table 11—Hospital B: Neonatal Mortality Rates Among All Obstetrical Discharges After Live Birth—Race Specific

Time	Race	Live Births	Neonatal Deaths	Neonatal Death Rate/1,000
January 1-December 31, 1956	White	1,616	24	15*
	Negro	1,530	40	26†
	Total	3,146	64	20‡
January 1-September 30, 1958	White	1,304	31	24*
	Negro	1,199	39	32†
	Total	2,503	70	28‡

* Differences between white neonatal deaths, 1956 and 1958, are not significant.
† Differences between Negro neonatal deaths, 1956 and 1958, are not significant.
‡ Differences between total neonatal deaths, 1956 and 1958, are significant, P less than 0.10.

Table 12—Hospital B: Expected Neonatal Deaths, Including Immature Deaths, During the First Nine Months of 1958, Assuming the 1956 Neonatal Mortality Rates and Percentage Weight Distribution Rates Prevailed

Race	Number of Births January-September, 1958	Number of Deaths January-September, 1958	Expected Number of Deaths from 1956 Total Neonatal Mortality Rate	Difference in Number of Deaths in 1958	Number of Deaths Under 1,000 gm	Expected Deaths Under 1,000 gm*	Difference in 1958
Negro	1,199	39	32	+ 7	19	13	+ 6
White	1,304	31	19	+12	10	4	+ 6
	—	—	—	—	—	—	—
Total	2,503	70	51	+19	29	17	+12

* Assuming 1956 weight distribution and 1958 weight specific mortality rate.

ministered to infants who survived the first 24 hours but subsequently died in the neonatal period were considered, only two statistically significant differences in the 1956-1958 weight specific comparisons were noted, namely: (1) a decrease in the use of streptomycin in prematures in 1958 (P less than 0.01); (2) an increase in the use of chloramphenicol in doses in excess of 50 mgm/kgm/24 hours in prematures in 1958.

This fact was felt to be of particular interest in the light of recent reports[5-7] suggesting that chloramphenicol in doses in excess of 50 mgm/kgm/24 hours may be toxic and at times fatal to small infants because of their poor ability to convert and excrete it. Detailed review of the charts suggested that at least five infants receiving chloramphenicol for minor illness developed a clinical course typical of that described in chloramphenicol toxicity and failed to show any significant pathological alterations at necropsy. Although the evidence presented here is inadequate to explain the rise in neonatal mortality rates on toxicity due to chloramphenicol, there is reason to consider this factor a "lead." It has been possible, since the original preparation of this report, to examine premature neonatal mortality records at this hospital for the six months immediately preceding and following the alteration of the standard therapeutic dosage of chloramphenicol to 20 mgm/kgm/24 hours. To the best of our knowledge no other changes in management of the nursery or criteria for drug administration have been instituted during this period. Table 10 shows the fall in premature mortality rates subsequent to the reduction in dosage of chloramphenicol—this is presented only as circumstantial evidence and, at the present time, one is not justified in concluding that there is a direct relationship between high neonatal mortality in Baltimore and what is now felt to be excessive doses of chloramphenicol.

Hospital B admits both private patients of staff physicians and ward patients who have been followed regularly in the hospital obstetrical clinic. This hospital also serves as a referral agency and thus receives a certain proportion of patients with complications and a greater prospect of a poor fetal outcome. Overcrowding is not so great a problem here. Table 11 shows a moderate rise in the neonatal mortality rate at this hospital in 1958. Analyses of the records here indicated that nearly 70 per cent of the rise in neonatal mortality could be explained by an increase in the number of immature (less than 1,000 gm) births and deaths, as shown in Table 12. This is an apparent consequence of a particular interest in the treatment of habitual aborters at this institution.

There was no evidence to suggest that there was any significant increase in deaths due to infection or other illness acquired in the nursery.

Summary

In summary, this study of neonatal mortality in several Baltimore hospitals revealed certain conditions worth more intensive consideration. At Hospital A, it was noted that there were possible direct relationships between the rise in neonatal mortality and the following factors:

1. a rise in the proportion of patients failing to seek prenatal care;
2. an increase in the incidence of puerperal morbidity;
3. a change in the age distribution of the neonatal deaths with an increase in the proportion of infants becoming ill and subsequently dying after the first 48 hours of life;
4. an excess dosage of chloramphenicol in the newborn, particularly premature infants.

In contrast, these factors played no significant role in the increase in neonatal mortality at Hospital B, where a rise in the number of immature deliveries alone was sufficient to account for their slightly elevated neonatal mortality rate.

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Comparative pathology and medicine may throw light on problems of human health. This study presents data on the prevalence and types of spontaneous cardiovascular disease in 3,000 dogs of all ages. Screening methods are discussed. Possible factors for epidemiological study are also touched on.

THE PREVALENCE OF SPONTANEOUSLY OCCURRING CARDIOVASCULAR DISEASE IN DOGS

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PREVIOUS studies at the Veterinary Clinic and Hospital of the University of Pennsylvania[1-11] indicated that the prevalence in dogs of diseases of the heart and blood vessels was considerably greater than generally suspected. Accordingly, in early 1958 a study was undertaken to determine the prevalence and types of spontaneous cardiovascular disease occurring in dogs of all ages presented to the Veterinary Clinic and Hospital.

Literature

In 1925 Ackerknecht[12] reviewed the existing literature on cardiac disease in domestic animals and together with Krause[13] covered the diseases of blood vessels four years later. Since most of the papers dealing with heart disease in dogs which have appeared in the decades following these reviews have been referred to in previous publications,[1-11] only a few will be cited here.

Lannek's studies on the dog electrocardiogram[14] have served as the basis for clinical work in dogs since 1949. In 1952 Detweiler[1] summarized the existing knowledge and reported the results of several years of clinical study. Dahme[15] in 1957 reviewed the literature on arterial disease in dogs and reported original studies on the types of vascular disease occurring in dogs with chronic interstitial nephritis. A summary of the clinical aspects of cardiovascular disease in dogs appeared recently.[11] An analysis of the first 1,000 dogs screened in this study has been published.[16]

Methods

Since a detailed account of the methods employed has already been published,[16] only a brief description will be given here.

Electrocardiography — Both direct writing and photographic recording electrocardiographs are employed. Standard limb leads, augmented unipolar limb leads, and four thoracic leads are taken routinely.

Phonocardiography — Conventional phonocardiograms and audiovisual records on tape are taken on selected cases.

Auscultation—The established auscul-

tation areas of the heart (mitral, tricuspid, aortic, and pulmonic valve areas[11]) are ausculted with a binaural stethoscope. Murmurs are graded according to intensity into five categories, Grade I comprising the faintest audible ones and Grade V those which can still be heard with the stethoscope chest piece removed a few mm from the chest wall.

Palpation of the Precordium—The cardiac region is palpated on each side of the chest to detect gross changes in the position of the heart, to locate thrills, and to detect abnormal arrhythmias.

Palpation of the Femoral Arteries—The femoral arteries are palpated simultaneously, and the relative character of the pulse in each is noted.

Blood Pressure Determination—Employing a sensitive capacitance microphone, the earliest appearance of a pulse wave below an inflatable cuff is used to determine the systolic blood pressure. In some cases, blood pressure is determined by direct puncture of the femoral artery or with the auscultatory or palpatory method using a Riva Rocci cuff applied to the hind leg above the tarsus and palpating or ausculting the dorsal pedal artery.

Roentgenography — Dorsoventral and lateral thoracic roentgenograms are taken at a target-film distance of 36 inches.

Angiocardiography — Cardiac catheterization is ordinarily carried out under pentobarbital sodium anesthesia. Radiopaque contrast medium (Hypaque—M 90 per cent, brand of Diatrizoate, Winthrop Laboratories) is given in a dose of 0.5 ml per pound of body weight by rapid injection with a Gidlund High Pressure Injector (Elema, Stockholm). Angiocardiograms are made using a Westinghouse Cine-Fluorex with a five-inch screen. Occasionally, angiocardiograms are made without special apparatus. An 18-gauge needle is inserted into the jugular vein. The radioopaque material is injected rapidly and one or two roentgenograms are taken as quickly as possible after the injection.

Clinical Laboratory Work — The methods for hemograms, hemoglobin determinations, hematocrits, sedimentation rates, urinalyses, blood chemical determinations, and microfilaria detection are standard.

Screening Procedure—All dogs entering the Veterinary Clinic each day are examined. The examination consists of the following: (1) auscultation of the mitral, tricuspid, aortic and pulmonic valve areas; (2) palpation of the precordium; (3) palpation of the femoral arteries; and (4) registration of a single semiunipolar precordial lead electrocardiogram.

Classification of Dogs Based on Screening Results—Each animal is placed in one of the following four categories: (1) No Heart Disease. This category includes all dogs in which no evidence of heart disease is discovered, and in which no condition known to cause heart disease is present. (2) Heart Disease. When dependable signs of heart disease are observed, cases are placed in this category. (3) Possible Heart Disease. Animals with signs suggesting cardiac involvement but not presenting dependable signs of heart disease are placed in this category. (4) Potential Heart Disease. Animals in which no signs of heart disease are present, but which have disease conditions (e.g., heartworm, severe anemia, hypertension) capable of producing heart disease, are placed in this category.

Dependable Signs of Heart Disease—The signs accepted as reliable evidence of heart disease are: (1) A Grade IV or greater systolic murmur; (2) a Grade III systolic murmur in the absence of anemia (anemic murmurs have not been present at hemoglobin levels above six grams per 100 ml of blood, although the accepted normal range for dogs in our clinic is between 12 and

16 gm per 100 ml); (3) a diastolic murmur; (4) a palpable precordial thrill; (5) generalized venous engorgement; (6) atrial fibrillation or flutter; (7) paroxysmal ventricular tachycardia; (8) atrial or ventricular extrasystoles consistently present and of frequent occurrence; (9) complete atrioventricular block; (10) left bundle branch block; (11) electrocardiographic right ventricular enlargement pattern; (12) radiographic evidence of gross heart enlargement, enlargement of one or more chambers, or pericardial effusion.

When one or more of the foregoing signs are present, the dog is placed in the heart disease category and further confirmatory studies are carried out at a later time.

Signs Suggestive of Heart Disease—Animals exhibiting signs suggestive of heart disease are examined further. Examples of such signs are: (1) A Grade I or Grade II systolic murmur; (2) ascites with or without limb edema; (3) radiographic evidence of borderline cardiac enlargement; (4) incomplete atrioventricular block; (5) electrocardiographic RS-T segment shifts of 0.2 millivolts or greater; (6) markedly diminished or absent pulsation in one or both femoral arteries.

In some cases, the presence of two or more signs suggestive of heart disease, when considered together, is taken as confirmation of cardiac involvement. An example of this is the finding of a Grade II systolic murmur at the mitral valve area in the absence of anemia, accompanied by roentgenograms indicating borderline left ventricular and left atrial enlargement.

Post-Mortem Examination—Necropsy procedure as outlined by Coffin[17] is followed. For histopathological examination of heart tissue, blocks are selected as recommended by the Armed Forces Institute of Pathology.[16] All organs are examined and histopathological sections made of the visceral organs, genitalia thyroid, parathyroid, adrenal gland, brain, and spinal cord. In addition to hematoxylin and eosin, special stains for fat, elastic tissue, connective tissue, and muscle are employed in selected cases.

Table 1—Results of Screening 3,000 Dogs for Cardiovascular Disease and Final Distribution after Clinical Confirming Studies and Necropsy Examinations

Category	Screen Result	Final Distribution
I. No heart disease	2,336	2,373
II. Heart disease	207	290
III. Possible heart disease	441	322
IV. Potential heart disease	16	15
Total	3,000	3,000

Results

Clinical Examination—Table 1 presents the results of the initial screening procedure on 3,000 dogs and the final distribution in the four categories after clinical confirming studies and postmortem examination had been completed.

The data given in Table 1 will require future revision since some of the cases will be studied further clinically and for certain individuals necropsy findings will become available.

Of the four procedures employed in screening, auscultation revealed abnormalities (murmurs, pathological arrhythmias) most often. The single lead electrocardiogram was next most important in detecting heart disease (arrhythmias, RS-T segment shifts, right heart enlargement pattern, low amplitude, atrioventricular conduction delays). Palpation of the precordium was useful in a few cases (thrills, cardiac displacement or enlargement) while pal-

pation of the femoral arteries failed to add any cases to the series from among these 3,000 dogs. However, in the subsequent 1,000 dogs examined two cases of thrombosis (one ilial and one aortic) were found.

The relative importance of individual confirming studies in the final diagnostic classification was about equally divided between radiography (thoracic roentgenograms and angiocardiography) and electrocardiography (10 lead electrocardiograms). Post-mortem examination was of final significance, of course, in all cases necropsied.

Types of Heart Disease Diagnosed—Table 2 presents the distribution of clinical and/or post-mortem diagnoses in the 290 dogs which had definite signs of heart disease.

The term chronic valvular disease refers to the most common macroscopic valvular lesion found on post-mortem examination in dogs which have cardiac murmurs during life. Typically, the valves are thickened with more or less deformity and distortion of the free edges and surfaces. The atrioventricular valves are most commonly affected, the mitral more often than the tricuspid. Often marked deformity occurs and valvular insufficiency results. Valvular stenosis is rare and very seldom of clinical significance. The aortic and pulmonic valves are occasionally affected in that order, but only rarely is the damage severe enough to produce serious interference with the valvular action although murmurs in these valve areas are sometimes audible and can be correlated with valve changes. On histological examination the diseased valves are seen to be thickened by fibrous proliferation with edema and mucinous degeneration.

Table 2—Types of Heart Disease Found Among 3,000 Dogs Screened (Clinical and/or Post-Mortem Diagnoses)

Congenital Heart Disease		15
Pulmonic stenosis	6	
Patent ductus arteriosus	4	
Aortic stenosis	3	
Interventricular septal defect	1	
Tetralogy of Fallot	1	
Acquired Heart Disease		275
Chronic valvular disease	143	
Myocardial disease	35	
Chronic valvular disease and myocardial disease	67	
Other (chronic cor pulmonale, metastatic neoplasms, heart base tumors and undiagnosed)	30	
Total		290

The term myocardial disease includes degenerative, inflammatory, and necrotic lesions which, when present, are usually found distributed throughout the myocardium. The degenerative lesions and necrotic lesions, some of which are in various stages of repair, are often associated with changes in the small coronary arteries which will be described under Post-Mortem Findings.

The term cor pulmonale is used for those cases of right ventricular enlargement resulting from disordered pulmonary circulation.[11] Clinically, the diagnosis is based on the finding of electrocardiographic and/or roentgenographic evidence of right ventricular enlargement and the presence of abnormally large pulmonary artery branches in thoracic roentgenograms. Not infrequently such changes are associated with heavy infestations of Dirofilaria immitis in the right heart and pulmonary arteries.

Post-Mortem Findings — Although many of the 290 dogs with heart disease have been necropsied, the results have been assembled from only 51 to date. In addition data are available from 128 other dogs necropsied but not studied clinically.[16]

Table 3—Comparison of Clinical and Post-Mortem Diagnoses in 51 Animals Necropsied

Clinical Diagnosis	No. of Animals	Post-Mortem Diagnosis	No. of Animals
Congenital pulmonic stenosis	1	Congenital pulmonic stenosis	1
Venous-arterial shunt	1	Patent ductus arteriosus	1
Chronic valvular disease	10	Chronic valvular disease	1
		Chronic valvular and myocardial disease	7
		Congenital pulmonic stenosis and chronic valvular disease	1
		No heart disease	1
Myocardial disease	14	Chronic valvular and myocardial disease	10
		Metastatic tumors involving the heart	2
		Acute myocarditis and epicarditis	1
		Focal purulent myocarditis	1
Chronic valvular and myocardial disease	11	Chronic valvular and myocardial disease	9
		Patent foramen ovale and chronic valvular and myocardial disease	1
		Acute valvular endocarditis and chronic myocardial disease	1
Pericardial effusion	1	Acute myocarditis, epicarditis	1
Pleural effusion	1	Aortic body tumor	1
Cor pulmonale	2	Dirofilaria immitis infestation	2
QRS axis abnormality	1	No heart disease	1
No heart disease	9	Chronic valvular and myocardial disease	8
		Chronic myocardial disease	1
	51		51

Table 3 compares the post-mortem and clinical diagnoses in the group of 51 dogs examined clinically before necropsy.

Two cases of congenital, valvular pulmonic stenosis were necropsied. One of these animals died at the age of five months; the second lived until two years of age. The younger animal was diagnosed correctly on the basis of clinical findings, while the older dog was believed to have tricuspid and mitral valvular insufficiency due to chronic valvular disease. Post-mortem examination revealed chronic valvular disease involving both atrioventricular valves as well as congenital stenosis of the pulmonic valve in the latter case.

A three-year-old Cocker Spaniel with polycythemia was thought to have a venous-arterial shunt, on the basis of blood oxygen saturation studies. Electrocardiographic and roentgenographic evidences of right ventricular hypertrophy were present, but no murmurs were heard despite repeated auscultation. The animal died before angiocardiographic studies could be made. At necropsy, a patent ductus arteriosus with a lumen as large as that of the

aorta was observed. The right ventricle was greatly hypertrophied. The flow of blood through this shunt was from right to left. Evidently, turbulence sufficient to produce a murmur was not present during the period this dog was under observation.

In a 14-year-old, male, German Shepherd, presented because of ascites and signs of pulmonary congestion, a clinical diagnosis of mitral and tricuspid insufficiency secondary to chronic valvular disease was made. The animal was treated for seven months, but destroyed because of signs of progressive pulmonary congestion which developed after the onset of atrial fibrillation. Chronic valvular and myocardial disease and a large, patent foramen ovale were observed on necropsy.

Only one animal necropsied had chronic valvular disease without significant myocardial disease. One animal had chronic myocardial disease unaccompanied by valve changes. In the latter case, no evidence of heart disease was detected during the screening examination.

Chronic valvular disease and chronic myocardial disease were observed together in 34 of the 51 animals necropsied. Of these, nine had clinical signs of both valvular and myocardial damage. Ten had clinical signs of myocardial disease alone, while seven had signs of valvular disease alone. Eight dogs showed no evidence of heart disease when screened, but had myocardial and valvular lesions when necropsied.

Acute bacterial valvular endocarditis was present in one dog together with chronic myocardial lesions. The clinical diagnosis in this case had been chronic valvular and myocardial disease.

Acute myocardial lesions were observed in three of the dogs necropsied. Two had acute myocarditis and epicarditis, while one had focal purulent myocarditis. Electrocardiographic changes suggesting myocardial disease were observed in two, while the third had auscultatory and radiographic signs of pericardial effusion. Hydropericardium as well as myocarditis and epicarditis was observed at necropsy in the latter. Heartworms (Dirofilaria immitis) were observed in the right ventricle and pulmonary arteries of two of the dogs necropsied. Both had clinical signs of cor pulmonale.

One eight-year-old German Shepherd presented with a massive pleural effusion had a heart base tumor which surrounded the anterior vena cave, pulmonary artery, and aorta.

Metastatic tumors were observed in the hearts of two dogs, both of which had electrocardiographic changes suggesting myocardial disease.

Two dogs, which were classified clinically under Category III, Possible Heart Disease, had no heart lesions on post-mortem examination. One was suspected of having chronic valvular disease on the basis of a low grade systolic murmur. The other had a QRS axis deviation which was believed to be abnormal, but has since been shown to be a normal variation owing to chest conformation.

The clinical diagnosis of valvular lesions was correct in 19 of 21 cases necropsied. Only one animal in which a clinical diagnosis of chronic valvular disease was made had no valve lesions on post-mortem examination. One had subacute bacterial valvular endocarditis. Since all grossly visible valvular lesions were considered in the post-mortem diagnosis, mild deformities of the valves, not advanced enough to produce valvular insufficiency, account for failure to detect the valvular change clinically in 18 of 35 dogs which had valvular and myocardial lesions at necropsy. The diagnosis of valvular lesions was based upon the detection and location of murmurs on auscultation of the heart and, in some cases, on the palpation of thrills in the precordial region.

Table 4—Summary of Principal Post-Mortem Findings in 69 Canine Hearts

Structures and Lesions	No. of Hearts
Coronary Arteries	
Thickened with narrowed lumen	54
Large thrombi	2
Emboli	1
Degeneration	6
Acute inflammation	4
Pericardium	
Hydropericardium	3
Hemopericardium	2
Subacute inflammation	1
Myocardium	
Acute inflammation	4
Abscess	1
Hemorrhage	13
Hypertrophy	9
Degeneration	27
Necrosis	17
Metastatic tumor	5
Endocardium	
Acute inflammation	1
Subacute inflammation	2
Left AV Valve	
Fibrosis	20
Subacute inflammation	2
Cyst	1
Right AV Valve	
Fibrosis	3
Subacute inflammation	2
Cyst	4
Left and Right AV Valves	
Fibrosis	16
Pulmonic Valve	
Acute inflammation	2
Cyst	1
Stenosis	2
Aortic Valve	0
Total for All Valves	
Fibrosis	39
Subacute inflammation	4
Acute inflammation	2
Cyst	6
Stenosis	2

Myocardial disease was detected clinically in 25 of 42 dogs which had myocardial disease at necropsy, including acute and chronic lesions and metastatic tumors involving the heart. Most clinical diagnoses of myocardial disease were made on the basis of electrocardiographic abnormalities such as atrial fibrillation, ventricular extrasystoles, left bundle branch block, and RS-T segment deviations. Although only about half of the dogs which had myocardial disease at necropsy had clinical evidence of the lesions, in each case in which a clinical diagnosis of myocardial disease was made, significant gross microscopic lesions were observed on post-mortem examination.

The results of post-mortem findings of hearts from 69 dogs from which tissues were submitted to histological study are presented in Table 4.

Thickening of the cusps of the atrioventricular valves was a common finding. Thirty-nine examples of this lesion were noted, of which 36 involved the mitral valve. This lesion is nodular, smooth, firm, and usually located at the free margin of the cusp involved. In the more advanced examples the cusps bulge convexly toward the atrial surface. This serves to curl under the free margin of the cusp and to effectively shorten the chordae tendinae by bending under those attached at the margin. In many instances it appears that the deformity with the accompanying malformation and stiffening of the cusps would have allowed regurgitation through the valve ring during life. The chordae tendinae usually are not thickened or altered in any other way. Exceptionally, in a few dogs with advanced valvular involvement marked thickening and shortening of the chordae tendinae has been observed. Microscopically these cusps are thickened by fibrous proliferation with edema and mucinous degeneration.

In contrast to the frequency of the

fibrotic or chronic valvular lesions, acute inflammatory changes were encountered in only two cases, subacute changes in four cases. In addition, subacute or acute mural endocarditis, not related to valvular inflammation, was noted in three hearts and acute myocarditis, or abscess formation in four. In one of the latter four hearts acute inflammation of the pulmonic valve was also present.

Cardiac hypertrophy was diagnosed in nine cases, eight of which also had fibrotic thickening of the atrioventricular valves.

Cardiac dilatation was diagnosed in 15 cases, five of which also revealed foci of myocardial necrosis. Grossly, the diagnosis of cardiac dilatation was based on the finding of enlarged cavernous ventricular chambers, flattened papillary muscles, and thin ventricular walls. Microscopically in dilatation the myocardial fibers are thin and certain groups are wrinkled or curled as though their attachment has ruptured. Cardiac dilatation was most frequently noted in the right ventricle and in many instances thought to be a terminal episode.

Small foci of myocardial necrosis in various stages of resorption and scar formation were found in 17 canine hearts. Some were not visible or went undetected during gross examination. Depending on their age and degree of healing, other necrotic foci were reddish brown or grey and opaque. They varied in texture from soft and friable to firm and even gritty in some instances. Microscopically these lesions are characterized by myocardial necrosis, infiltration by monocytes, fibrosis, and calcification of necrotic myocardium. Congestion and hemorrhage are often seen in and adjacent to the necrotic areas. There is some variation in size and etiology. Thrombosis, embolism by blood clots, or tumor cells are some of the more apparent causes. Arteriosclerotic narrowing of arterial lumens is probably responsible for some others. In such instances the variation in size is undoubtedly related to the magnitude of the vessel occluded. The possibility that some unknown agent may directly damage the myocardium, producing these lesions, cannot be ruled out. These necrotic foci are not large, but frequently multiple and scattered throughout the myocardium. In 14 cases the lesions were located in the myocardium of the left ventricular wall and anterior papillary muscle. Four did not involve the papillary muscle but often were adjacent to this area and four others were limited to the papillary muscle. Both left and right ventricle were involved in only one case and the change was limited to right ventricle in two cases. This is an insufficient number of cases from which to draw any conclusions concerning sites particularly prone to this process.

Fifteen of these hearts also evidenced arterial thickening with narrowing of the lumen upon microscopic examination. The vessels changed were always small intramyocardial branches of the coronary arteries. Thirteen of the 17 hearts also revealed fibrous thickening of the atrioventricular valves.

Degenerative changes in the myocardial fibers less severe than actual necrosis were observed in 27 cases. The myocardium in these cases is pale, grey, and parboiled in appearance. Microscopically, the cells are swollen, the cytoplasm is granular and the striations are not clear (cloudy swelling). Nuclear changes are not prominent in these cells.

The most commonly encountered lesion was arterial thickening, limited to intramyocardial arterioles and small arteries. This microscopic lesion was seen in 54 of the hearts. In this series, the medium-sized surface coronary arteries were free of lesions. The two types of change seen in the intramural vessels are hyaline arteriolosclerosis and hyperplastic arteriolosclerosis. The latter

type is sometimes further divided into medial and intimal arteriolosclerosis. In the hyaline form of arteriolosclerosis an amorphous, eosinophilic material is present which markedly thickens the arterial wall and reduces the lumen. There is a loss of cellular detail except in the covering endothelium and the adventitial portion. Elastic, muscular, and fibroblastic elements are not differentiated even with special stains. The hyperplastic variety of arteriolosclerosis has an increased cellularity evident in the wall, apparently the result of proliferation of endothelial cells, subintimal fibroblasts and the smooth muscle cells of the media. Gradations between the hyaline and hyperplastic form are common. In these arteries the wall may be hyalinized in a small focal portion or around the circumference in the inner medial layers. Of the 54 hearts in which arterial changes were found, the arteries of 19 were thickened as a result of hyperplastic arteriolosclerosis with varying degrees of hyaline change.

Arterial cushions were not infrequently seen in small coronary arteries and arterioles. On cross-section these structures are usually wide at the base and taper to a rounded blunt tip, sometimes occluding much of the vessel. These cushions are eosinophilic, amorphous, covered by a layer of endothelium and contain varying numbers of nuclei. The nuclei are round or oval on cross-section or oblong and oval on longitudinal section. They are either darkly basophilic or pale centrally, with no visible nucleoli. Elastic stains have demonstrated that the elastic membrane below these structures is fragmented and in some examples forms a network within the cushion. Some of the hearts with arterioles thickened by hyaline arteriolar sclerosis exhibit hyaline changes in these cushions as well as in the arterial wall. In these instances, the elastic tissue is absent or condensed into an irregular-shaped mass near the base of the cushion. These structures are consistently negative for Weigert's fibrin stain. With Masson's Trichrome stain they vary in their staining quality. If relatively heavily nucleated and there is no hyaline change in the arterial media the cushion stains like smooth muscle. If there is hyaline change in the arterial media, there is usually hyaline change with loss of nuclei in the cushion and it stains like hyaline, collagen, and connective tissue elements.

These structures are apparently smooth muscle and elastic tissue cushions arising from the arterial wall. The opinion expressed by Dahme[15] and Bucher[18] is that they are normal structures, containing longitudinally aligned smooth muscle. It is apparent from Dahme's[15] studies, that these cushions may show degenerative and sclerotic change when the arteries are diseased.

Such cushions were found in the small arteries in 35 hearts. The distribution in the left ventricle was in papillary muscles alone in eight cases, only in areas other than papillary muscles in six hearts, and in 21 hearts they were in vessels in papillary muscles as well as other portions of the myocardium. They were present in the right ventricular myocardium in three hearts.

Sclerotic changes were noted in the aorta in six animals. Grossly, the lesions were pale yellow, raised, roughened, and firm; microscopically, they were seen to be the result of intimal proliferation. They were most frequent in the abdominal aorta. All of these dogs also had thickening of the media in small branches of the coronary arteries as described in the foregoing. There were no lesions resembling atherosclerosis. Medial thickening of the arteries in other organs was also noted, but not as advanced as in the coronary arteries. Sclerosis of the pulmonary artery was seen in six cases. This lesion was visible by gross examination of the intima of the pulmonary trunk and

the origin of the large branches. Four of these dogs also had fibrotic mitral valves and the fifth had tumor metastases in the lung.

Metastatic tumors were noted in the myocardium of five hearts. One aortic body tumor was found. Blood cysts or telangiectasis of the valve were noted in six cases. Six hearts contained Dirofilaria immitis and there were two cases of congenital pulmonic stenosis.

Age-Specific Prevalence of Heart Disease—The age-specific prevalence rates of heart disease based on the 3,000 dogs included in this study are given in Table 5. The expected rates of various types of heart disease were computed for five age groups from the 290 dogs finally placed in category II, Heart Disease.

The prevalence of all types of acquired heart disease increases with age. In dogs over five years of age brought to this clinic at least one in ten and in those over 12 years old between three and four in ten would be expected to have heart disease.

As expected, congenital heart disease is most common in the group under four years old. One reason for the higher rate of congenital heart disease in the one- to four-year-age group than in the under one-year group is that signs of disease are frequently not apparent to the owner until the animal matures and the cardiac disability becomes relatively more severe.

The group "other" includes heartworm disease (Dirofilaria immitis), heart base tumors, metastatic tumors involving the heart, and undiagnosed cases.

Necropsy findings show that both valvular and myocardial lesions are present in a higher number of dogs than those exhibiting clinical signs of heart disease. Thus a study based on necropsy findings entirely would undoubtedly give a higher prevalence rate in all age groups than that reported here. For the same reason, the almost invariable coexistence of chronic valvular and myocardial disease in the same hearts which was evident in the dogs necropsied, is not reflected in Table 5.

Auscultatory and Electrocardiographic Abnormalities

Murmurs—Based on the location of the area of greatest intensity and timing in the cardiac cycle the following clinical diagnoses of valvular and other disorders have been made (listed in order of decreasing frequency): mitral insufficiency, tricuspid insufficiency, pulmonic stenosis, patent ductus arteriosus,

Table 5—Prevalence Rates of Heart Disease in Dogs of Various Age Groups—Data from 3,000 Dogs

	Age Groups (Years)				
	Under 1	1-4	5-8	9-12	13 and Older
	(Prevalence Rate per 1,000 Dogs)				
Chronic valvular disease	2.3	14.4	72.0	162.0	214.0
Myocardial disease	1.2	12.3	9.2	37.5	42.6
Chronic valvular with myocardial disease	0	3.1	13.8	37.5	85.1
Congenital heart disease	2.3	7.2	1.6	0	0
Other	3.5	10.0	10.7	17.5	25.6
All types	9.3	47.0	107.3	254.5	367.3

aortic stenosis, and aortic insufficiency. For the most part these clinical diagnoses have been verified post mortem in those dogs necropsied[16] and in those subjected to angiocardiography or cardiac surgery.

In addition to the foregoing murmurs, the systolic murmur of interventricular septal defect, systolic and diastolic gallop sounds, and the atrial or fourth heart sound in incomplete atrioventricular block with dropped beats have been encountered in this series of dogs.

Systolic murmurs associated with anemia have been found, and in all questionable cases, the hematocrit is determined to verify or identify anemic murmurs.

Correlation with necropsy findings in 21 cases showed that the clinical diagnosis of a given lesion was correct (i.e., the expected lesion found on post-mortem examination in 19.[16] In several of these other valves were also involved. In one case no valvular lesions were present and in a dog with pulmonic stenosis and chronic atrioventricular valvular disease, a diagnosis of mitral and tricuspid insufficiency had been made but the pulmonic lesion had not been identified.

Arrhythmias—A total of 124 abnormal arrhythmias and conduction disturbances were identified among 3,000 dogs. These are listed in Table 6.

RS-T Segment Deviation—RS-T segment deviations exceeding 0.2 mV. in limb leads and exceeding −0.3 mV. or +0.15 mV. in precordial leads have been found in several dogs. Three of these were necropsied. Early myocardial degeneration and arterial thickening were present in all three hearts.

Right Heart Enlargement Pattern—The electrocardiogram from dogs with right heart enlargement has been found to be characterized by tardy QRS forces directed toward the right, resulting in marked deviation of the mean electrical axis of the QRS complex to the right and by the presence of large S waves in precordial leads over the left ventricle.

Table 6—Types and Frequency of Occurrence of Spontaneous Abnormal Arrhythmias and Conduction Disturbances in 95 Dogs from a Sample of 3,000 Dogs

Ventricular extrasystoles	43
Atrial extrasystoles	14
Atrial fibrillation	13
Incomplete atrioventricular block	12
Incomplete atrioventricular block with dropped beats	12
Paroxysmal ventricular tachycardia	8
Ventricular parasystole	4
Paroxysmal atrial tachycardia	3
Atrioventricular nodal extrasystoles	3
Atrioventricular dissociation	3
Atrial flutter	2
Complete heart block	2
Left bundle branch block	2
Right bundle branch block	2
Wolff-Parkinson-White syndrome	1
Total	124

This pattern, in modified form, is also seen in certain breeds with a deep, narrow thoracic cage (e.g., Whippet). In this group of animals the pattern must be considered normal.

In dogs with a relatively short, wide thorax (e.g., English Bulldog) or those with the more common conformation (e.g., Cocker Spaniel) the right heart enlargement pattern may be correlated with enlargement of the right ventricle. Such records are found in dogs with pulmonic stenosis and severe heartworm infestation.

Discussion

The screening methods employed to detect cardiovascular disease in dogs revealed abnormalities in about 20 per cent of the animals examined and the presence of such disease was confirmed

in about half of these by further clinical and/or post-mortem studies.

Auscultation, electrocardiography, and roentgenography were the most useful of the diagnostic procedures employed in recognizing heart disease. Since valvular disease is the most prevalent form of heart disease clinically recognized, auscultatory abnormalities were the most frequent found. Thus, auscultation is the most useful screening method, since both murmurs and abnormal arrhythmias can be recognized. Electrocardiography and roentgenography are of about equal usefulness. Ideally, multiple lead electrocardiograms and lateral thoracic roentgenograms should be employed in screening dogs for heart disease, but cost precluded their use in this study.

It is clear that the prevalence of spontaneous heart disease in dogs is higher than generally known. Apparently, well over 10 per cent of dogs presented to our veterinary clinic have some sort of cardiac abnormality. The most common abnormality found is a systolic murmur at the mitral area. When anemia is ruled out as a cause, most of these systolic, apical murmurs are found to be associated with insufficiency of the mitral valve caused by chronic valvular disease. This valvular lesion is known to be common in dogs over five years of age, increasing in prevalence with advancing age of the population sampled. Although the classical view is that these valvular lesions represent the healed phase of a bacterial endocarditis, our studies neither confirm nor refute this hypothesis. However, the possibility that not only local infectious processes, but also antigen-antibody reactions can produce valvulitis, as has been shown in experimental animals, must be considered.

Of the dogs which have valvular murmurs, only a few die of congestive heart failure. Our necropsy findings reveal that a combination of chronic atrioventricular valvular disease and myocardial disease is usually present in dogs developing clinical evidence of chronic congestive heart failure.

Coronary artery disease in dogs is confined almost entirely to the small intramyocardial arteries. True atherosclerosis was not seen, and the large superficial arteries were free of pathological changes. Thus small vessel disease was usually associated with degenerative or necrotic changes in the myocardium, suggesting that the vascular alterations resulted in myocardial damage owing to interference with the blood supply.

Endothelial cushions were fairly common in the small arteries of hearts of older dogs. Their possible relation to myocardial disease is not clear. They sometimes encroach markedly on the lumen of small coronary vessels and not infrequently are themselves subject to fatty infiltration. At present their possible function or influence on blood supply when diseased cannot be assessed.

A few individuals thought to have arterial hypertension have been encountered and post-mortem findings have confirmed the clinical impression. However, none have been studied sufficiently ante-mortem to establish the diagnosis. A relationship between chronic renal disease, arterial hypertension and arteriosclerosis is evident from the studies of others,[11,15] but as yet our data do not contribute to the observations already made.

It has been established that dogs commonly suffer from cardiovascular diseases of the following types: congenital anomalies, heartworm, chronic valvular fibrosis, arteriosclerosis of the intramyocardial and other vessels, and myocardial degeneration and infarction. The vascular, myocardial, and valvular lesions commonly occur together in the same heart.

The etiology of valvular, myocardial, and vascular changes can only be con-

jectured or hypothesized at present. It is tempting to speculate that a relationship exists between the commonly occurring chronic interstitial nephritis of dogs and these cardiovascular lesions, since they usually coexist. However, the fact that such renal lesions occur in about 60 per cent of dogs suggests that the relationship may be fortuitous.

Dogs suffer from a variety of viral, bacterial, and parasitic diseases, all of which produce antigen-antibody reactions and specific tissue damage that can involve the cardiovascular system. The long-term effects of repeated infections may be responsible for both renal and vascular lesions. In this context, it is appropriate to mention leptospirosis, which is known to be widespread in the canine population the world over and which will produce renal and vascular lesions in spontaneous and experimental infections.

It is a clinical impression that murmurs are more common in dogs which have chronic skin disease, but as yet no data have been assembled to support this. The impression that male dogs more commonly have heart disease has not been supported by our data for young dogs, although there may be a statistically significant difference in older dogs. However, chronic congestive heart failure was 2.5 times more frequent in the male than the female.

To date no breed, dietary or environmental factors have been elicited which can serve as hypotheses upon which to plan an epidemiological study. The data now accumulated on over 4,000 dogs will be analyzed for such information and an attempt to plan a meaningful epidemiological study made.

Summary

Three thousand dogs have been screened by clinical methods for the presence of cardiovascular disease. In 290 animals reliable signs of heart disease were found through clinical and post-mortem studies. Three hundred and twenty-two additional dogs presented signs suggesting heart disease, but the diagnosis could not be confirmed on further examination or the animals were not seen again.

The clinical screening methods consisted of palpation of the cardiac region, auscultation of the heart, palpation of the femoral arteries and the recording of a single lead, precordial electrocardiogram. Confirming studies included ten lead electrocardiograms, phonocardiograms, blood pressure determinations, thoracic roentgenograms, angiocardiograms, and clinical laboratory studies.

The most common types of cardiovascular disease found were: (1) chronic valvular fibrosis; (2) myocardial disease (necrosis, degeneration, myocarditis), sclerosis of the deep coronary arteries, and right ventricular dilatation and hypertrophy associated with Dirofilaria immitis infestation; and (3) congenital heart diseases.

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League for Nursing Meets in April

"Health Needs—Whose Problem? Whose Responsibilities?" are questions to be aired at the opening session of the 1961 National League for Nursing Convention (April 10-14, Cleveland) by Ralph E. Dwork, M.D., director of the Ohio State Department of Health, and Mildred E. Newton, director, Ohio State University School of Nursing. Theme of the entire convention will be "Interaction—Key to Nursing Progress."

Among the NLN components which will hold business and program sessions during this biennial meeting are the councils on maternal and child health nursing, occupational health nursing, practical nursing, psychiatric and mental health nursing, the Department of Public Health Nursing member agencies, the Tuberculosis Nursing Advisory Service, the Committee on Careers in Nursing, the Evaluation Service, and the Research and Studies Service.

The Department of Public Health Nursing will hear Ruth Freeman, Ed.D., associate professor of public health administration, speak on "Measuring the Effectiveness of Public Health Nursing Services." Also scheduled are a discussion on "Manpower—Challenge of the 1960's" at a meeting of the Department of Hospital Nursing, and a report to NLN's two nursing education departments on a cost study of education. The closing general session will be on research.

Since 1955, an epidemiologic investigation of streptococcal infection has been conducted in three Philadelphia schools. On the basis of their findings, the investigators question the utility of school detection programs based on current means of discovering streptococcal infection.

EPIDEMIOLOGIC STUDIES OF STREPTOCOCCAL INFECTION IN SCHOOL CHILDREN

David Cornfeld, M.D.; John P. Hubbard, M.D., F.A.P.H.A.; T. N. Harris, M.D.; and Ruth Weaver, M.D.

An epidemiologic study of streptococcal infections has been conducted in three elementary schools in Philadelphia since November, 1955. The children have been studied to determine the carrier rate, the rate of clinically manifest infection, and, in the first three years of the program, the effect of various schedules of treatment with penicillin on both the carrier rate and the rate of infection. Previously reported data from the years 1955 to 1957[1,2] indicated that: (1) in each of the school years approximately one-half of the children had one or more positive cultures for beta-hemolytic streptococci regardless of attempts at carrier control by penicillin treatment; (2) the rate of clinically manifest streptococcal infection remained relatively low in all schools independently of the existing carrier rate or treatment programs instituted; (3) relatively few of the children with respiratory symptoms had positive cultures for beta-hemolytic streptococci and, even in the group with positive cultures, most of the children presented symptoms of undifferentiated upper respiratory illness.

This paper presents additional information acquired in years 1957 through 1959. These data comprise an extension of those already reported and, in addition, results from serologic studies made during 1958-1959.

Methods

In the school years 1955 through 1958, children of three schools were followed, and throat cultures were taken routinely each month. Cultures were also obtained, either in the school or at home, from children developing any of the following symptoms or signs: hyperemic pharynx with or without exudate, cervical adenopathy, or earache. The presence of fever was also noted. For children whose only complaint was that of sore 'throat, the throat was examined for evidence of pharyngeal inflammation before the throat culture was taken. A follow-up throat culture was taken after a three-week interval on all children who had cultures positive for beta-hemolytic streptococci in association with respiratory illness. A trained technician who was employed through the four years of the study was responsible for obtaining specimens.

The over-all effectiveness of penicillin

therapy for children with throat cultures positive for streptococci was studied by use of the following treatment schedule: (1) In School G, penicillin was given to all children with positive cultures, whether carriers or with symptoms of respiratory illness, and also to contacts having positive cultures; (2) in School B, penicillin was dispensed only to those children with respiratory symptoms in whom a positive throat culture was obtained; (3) in School W, no penicillin was recommended or provided. However, positive cultures were reported to the parents and note made of any treatment given to the child by the family physician.

In the years 1955 through 1958, in two of the schools, throat cultures were also obtained on family contacts of children who were found to have positive cultures either on routine culture or at the time of a respiratory illness.

In 1958-1959, the study was limited to children attending School B. They were surveyed as in the foregoing with the exception that positive throat cultures from ill children were reported to the family but no penicillin was provided for treatment (the same procedure as with School W in the previous years).

Blood serums were also obtained at regular intervals from all children and coded as follows: (1) specimens obtained at the beginning of the school year from all participants—R_1; (2) serums obtained on all streptococcal carriers within four days after the carrier state was discovered—R_2; (3) serums obtained at the end of the school year on all children who had had consistently negative throat cultures throughout the term (both on routine survey and in association with respiratory illness)—R_3; (4) acute phase serums were taken immediately following any respiratory illness; if a positive throat culture were obtained from such a child —B_1; if the culture were negative—N_1; (5) convalescent serums obtained three weeks after acute serums, in children who had had an acute respiratory illness—B_2 or N_2.

Laboratory Methods

Laboratory methods were described in detail in previous publications.[2-4] A poured plate method was used for isolation of streptococci. The cultures were graded from one to five plus on the basis of frequency of streptococcal isolations as follows:

One Plus—One colony of beta-hemolytic streptococci for each 100 or more colonies of other microorganisms

Two Plus—One colony of beta-hemolytic streptococci per 50 to 100 colonies of other microorganisms

Three Plus—One colony of beta-hemolytic streptococci per 20 to 50 of other microorganisms

Four Plus—One colony of beta-hemolytic streptococci per five to 20 colonies of other microorganisms

Five Plus—A pure or almost pure culture of beta-hemolytic streptococci was obtained.

Antistreptolysin (ASO) titrations were done using a modification of the original Todd technic.[3] Antihyaluronidase (AH) titrations were done using the mucin clot prevention method.[4] The data are recorded in Table 5 and Figure 1 as geometric mean titers.

Results

In the last two years of the study (1957-1959), positive cultures were again obtained in approximately one-half of the study population (Table 1). As noted previously, the routine cultures from healthy children accounted for the large majority of these positive reports.

The average monthly carrier rate for each of the schools was as follows:

Year	School G	School B	School W
1955-1956	7.4	13.1	14.6
1956-1957	10.1	15.5	28.8
1957-1958	9.5	17.0	16.2
1958-1959		21.8	

Table 1—Per cent of Children with One or More Positive Cultures

Approximately 50 Per cent of Children Had One or More Positive Cultures Each Year

Year	School G		School B		School W	
	Number	Per cent	Number	Per cent	Number	Per cent
1955-1956	233	53.6	456	46.9	468	47.4
1956-1957	248	47.5	385	56.8	454	68.2
1957-1958	324	40.9	460	47.4	255	56.3
1958-1959			399	66.3		

Over 40 per cent of the children in School G were treated with penicillin during the course of the school year. In each of the study years, the carrier rates in this school (School G) were found to be considerably lower than in the other two schools where no penicillin was given to the carriers.

The incidence of respiratory infection associated with throat cultures positive for beta-hemolytic streptococci is noted in Table 2. There was no significant difference in the "infection" rate in the three schools regardless of the penicillin treatment program used. Further, the over-all "infection" rate was at a low level through each year of the study with no increase in streptococcal infections occurring at the time when high streptococcal carrier rates were noted.

Table 3 contains follow-up data on both carriers and children with respiratory illness and positive cultures. Persistently positive carrier cultures were found most frequently where antibiotic therapy was not recommended and the number of positive follow-up cultures also varied directly with the extent of antibiotic control attempted.

The frequency of occurrence of signs and symptoms suggestive of streptococcal illness is listed in Table 4. A comparison between those children with such symptoms who had positive cultures and those who had negative cultures at the time of the original clinical diagnosis shows no significant difference in the frequency of individual signs and symptoms in the two groups. Thus the clinical differentiation between streptococcal and nonstreptococcal illness was unreliable. Further, it seemed likely that many of the children considered to be in the streptococcal infection category actually represented carriers who had contracted intercurrent nonstreptococcal respiratory illness. An attempt was made to distinguish between the two groups by the use of several laboratory technics:

1. Grouping and typing of streptococci obtained from carriers and symptomatic children in 1958 revealed that 72 per cent of the former and 76 per cent of the latter were of group A, with a greater frequency of typable strains in the symptomatic group (23 per cent compared with 39 per cent). However, because of the great percentage of untypable strains encountered, this criterion was not helpful in diagnosing the individual case.
2. Bacterial counts were done on positive cultures obtained from children with respiratory illness and from carriers. Forty-two per cent of the children with respiratory illness and positive cultures for beta-hemolytic streptococci had "four plus" or "five plus" cultures. However, in comparing the bacterial counts with symptomatology, even for those children with red throats and tonsillar exudate, 45 per cent had only "one plus" or "two plus" bacterial counts. Further, 18 per cent of the carrier group with no manifest symptoms had "four plus" or "five plus" cultures. These figures indicate that cultures from symptomatic children contained larger numbers of streptococci more frequently than did cultures from carriers, but even

Table 2—"Infection" Rate: Number Group A Beta-Hemolytic Streptococcal "Infections" per 100 Children per School Year

The "Infection" Rate is Similar in the Three Schools Regardless of Penicillin Treatment Program

Year	School G*	School B*	School W
1956-1957	16.1	19.3	18.7
1957-1958	11.1	10.9	12.6
1958-1959		19.5	

* Schools included in penicillin treatment program.

in the latter group there was a large number of children who yielded a heavy growth of streptococci. Bacterial counts per se, in the individual case, therefore, did not conclusively help to distinguish the child with definite streptococcal disease from the carrier.

3. In immunologic studies done on ill children, there was no significant difference in geometric mean ASO titers or AH titers of the acute or convalescent blood serums obtained from children with either positive or negative throat cultures (Table 5). Six of the 58 children with negative cultures had significant increases in the ASO or AH titers (a fourfold increase in titer) and two had significant decreases. In the group of children with positive cultures only six of 35 had significant increases in the ASO or AH titer and none had significant decreases. Thus, the serologic studies did not serve to distinguish between the two groups of children. Six of the children with negative cultures had significant antibody rises, probably representing infections missed by the use of routine bacteriologic methods for streptococcal isolation. In 29 of 35 cases with positive cultures in a group of children with manifest clinical infection, there was no significant immunologic response, suggesting that these cases represented nonstreptococcal respiratory illnesses with coincident streptococci in the throat. In reviewing the entire group of ill children, it was found that an ASO titer of 256 or greater (a range suggestive of recent streptococcal infection) was found among children with negative streptococcal cultures, in 33 per cent of the serums obtained in the acute stage of the infection and in 31 per cent of serums at the convalescent stage. Similar data were obtained from the children with positive cultures, among whom 32 per cent had an acute phase serum with a titer 256 or greater and 38 per cent had a convalescent serum with a titer in this range.

In addition to specimens obtained in association with respiratory illness, serums were drawn at regular intervals through the school year. The results are shown in Table 5. Comparison of the children who became carriers (R_1—R_2) with those who remained free of streptococci throughout the school year (R_1—R_3), revealed no significant difference in the mean ASO and AH titers in the two groups. However, of a total of 115 children in the carrier group, 32 showed significant ASO or AH increases and none showed significant de-

Table 3—Follow-Up Data: Effect of Penicillin Treatment on: (1) Persistence of Streptococci in Throat Cultures of Carriers; (2) Rates of Streptococcal "Infections"

The Per cent of Positive Follow-Up Cultures Varies with the Extent of Antibiotic Treatment

	(1) Per cent of Carriers Positive Three Months or More		
Year	School G*	School B	School W
1955-1956	2.1	8.1	11.3
1956-1957	8.5	12.5	31.8
1957-1958	6.2	20.9	18.0
1958-1959		27.5	

	(2) Per cent of "Infections" with Positive Cultures at Three Week Follow-Up		
Year	School G*	School B*	School W
1956-1957	10.0	10.0	27.5
1957-1958	18.5	19.5	53.6
1958-1959		44.4	

* Schools included in penicillin treatment program.

Table 4—Analysis of Signs and Symptoms in Respiratory Infections (1958-1959)

No Clinical Difference Was Noted Between Children with Positive Cultures and Those with Negative Cultures

Signs and Symptoms	Positive Culture		Negative Culture	
	Number	Per cent	Number	Per cent
Red throat	53	40.6	109	46.6
Red throat with exudate	17	13.3	13	5.6
Swollen glands	11	8.5	16	6.8
Earache	25	19.2	52	22.4
Fever over 101°F	24	18.5	44	18.8

creases, suggesting that about 25 per cent of these children had subclinical infections which could not have been diagnosed without the routine throat culture and immunologic studies. In the group of 79 children who had no positive cultures during the course of the school year, ten showed significant increases in either ASO or AH titer, indicating the probable occurrence of streptococcal infection not revealed by routine throat cultures. The fact that 36 per cent of the carriers and only 15 per cent of the noncarriers had ASO titers of 256 or greater adds further evidence to this opinion.

In Figure 1 the geometric mean ASO titers of children in acute and convalescent stages of respiratory illness are compared with the mean titers of streptococcal carriers. The groups with positive cultures are further analyzed by graphing throat culture colony counts against ASO titers. There is no immunologic distinction between the group of ill children and the carriers, and none can be noted on comparing the children who had "four or five plus" cultures with those who had cultures with fewer streptococci.

Among observations of a more general nature, comparisons of streptococcal carrier rates and infection rates in the various age groups revealed no significant differences between the six- to nine-year-old classes and the nine-to twelve-year-old group. Likewise, family size and economic status as determined by the criterion of number of people per bedroom did not seem to influence the frequency with which a child became a carrier, or to affect the infection rate. Only 10 per cent of the families of children who had positive cultures had members with streptococci in their throat and only about one-half of the group of family contacts had streptococci of the same type as the school child.

Discussion

The program described in the foregoing was originally initiated to determine practical and effective methods for community control of beta-hemolytic streptococcal infections, with a view to the primary prevention of rheumatic fever. This epidemiological study seemed particularly urgent in view of the spreading popularity of the streptococcal detection programs already in operation (47 programs by 1959) throughout the United States.[5] Because of the results demonstrated in this study, we question the efficacy and advisability of programs in which penicillin treatment is recommended for any child with a respiratory illness in whose throat streptococci are found.

Throughout the four years of our study, more than 50 per cent of the children under observation had one or more positive cultures for beta-hemolytic streptococci at some time during the school year. Thus, when attempts were made to eradicate streptococci from the throats of the carriers as well as from the children with clinical infection, it was necessary to treat one-half of a school population with penicillin. Further, despite carrier rates ranging up to 29.8 per cent, comparable to those cited elsewhere,[1] the incidence of streptococcal illness remained relatively low with the monthly incidence of "streptococcal infection" varying from 1.4 to 2.4 per 100 children studied. This rate is comparable to that reported recently from England by Williams,[6] who recorded 1.9 infections per 100 children per month in a similar school population.

Brumfitt[7] emphasized the difficulty in clinical differentiation between the streptococcal and nonstreptococcal illnesses and suggested the term benign streptococcal sore throat for the poorly defined illness due to streptococci occurring in an endemic pattern.

To help determine which child, among those who had streptococci in the throat, had a streptococcal infection and thus deserved treatment, an attempt was made to differentiate between the child who was carrying streptococci when he developed intercurrent respiratory illness and the child whose illness was due solely to the presence of pathogenic streptococci. The following methods were used: (1) Analysis of the symptomatology—in children with respiratory illness, there was no significant difference in the signs or symptoms between the group who had positive cultures and the group who had negative cultures; (2) bacterial counts—although a greater percentage of the children with pure or almost pure growth of streptococci was found in the group of patients with respiratory illness than among well children who had cultures taken routinely, a large number of asymptomatic children also had a heavy growth of streptococci in their throats, and, even in the group of children with exudative pharyngitis and fever, approximately 50 per cent had low bacterial counts; (3) immunologic methods —serums obtained at the acute and

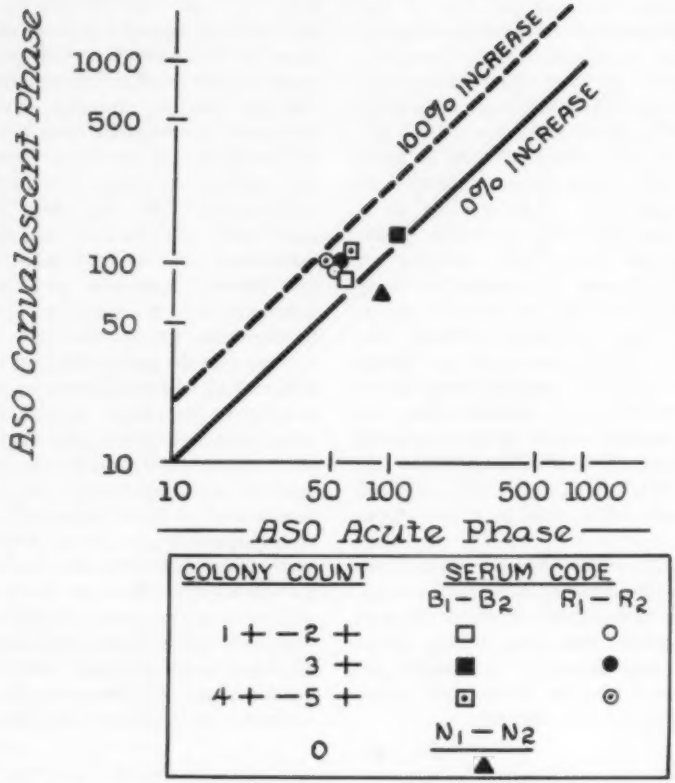
Table 5—Antistreptolysin-O and Antihyaluronidase Data: Titer Changes in Carriers, Noncarriers, and Children with Respiratory Illness

Titer Increases Were Noted in a Large Number of Carriers and in Only a Small Per cent of Children with "Infections"

Category	Number of Cases	Number with Significant Titer Changes (2 Tube)	Mean ASO Titer		Mean AH Titer	
			Acute Stage	Conv. Stage	Acute Stage	Conv. Stage
N_1-N_2	58	6↑-2↓	108	70	54	51
B_1-B_2	35	6↑-0↓	83	108	70	96
R_1-R_2	115	32↑-0↓	61	102	45	76
R_1-R_3	79	10↑-3↓	54	58	42	42

Serums Code: N_1-N_2 = Respiratory illness, negative culture
B_1-B_2 = Respiratory illness, positive culture
R_1 = Routine—at start of school year
R_2 = Routine—following onset of carrier state
R_3 = Routine—end of year (no positive cultures in year)

Figure 1



ASO titer change is plotted logarithmically against bacterial colony counts. On abscissa is plotted the initial ASO titer; on the ordinate the convalescent ASO titer. Points on the lower oblique line represent children whose ASO titer neither rose nor fell during convalescence. The upper oblique line represents an increase of 100 per cent in titer in convalescence. Each point represents the geometric mean ASO titer for the group of children designated by the code system in the box at the bottom of the chart.

Serums Code: N_1-N_2 = Respiratory illness, negative culture
B_1-B_2 = Respiratory illness, positive culture
R_1 = Routine—at start of school year
R_2 = Routine—following onset of carrier state

convalescent stage, at the same time as the initial and follow-up cultures on children with respiratory illness, showed no significant difference in the titers of two streptococcal antibodies between the children who had positive cultures and those who did not. In addition, a number of children without respiratory illness had streptococcal antibody titer increases, indicating occurrences of occult infection. Correlation of the ASO titer changes with the bacterial counts

performed on cultures of the children who had positive cultures indicated no greater titer rise in the groups with heavier streptococcal growth.

Summary

An epidemiologic study of streptococcal infection has been conducted in three Philadelphia schools since 1955. In each of the years, comparable data indicated a relatively high carrier rate for beta-hemolytic streptococci and a low incidence of respiratory infection accompanied by throat cultures positive for streptococci. It was not possible to distinguish the child with streptococcal infection from the child with nonstreptococcal infection on clinical grounds.

Bacterial counts on positive cultures did not help to differentiate between streptococcal carriers who had intercurrent respiratory infections and the children with bonafide streptococcal disease. Serologic studies for two antistreptococcal antibodies were also not helpful in this regard.

In view of the data cited in this paper, we question the advisability of instituting school streptococcal detection programs which are based on current means of detecting streptococcal infection.

ACKNOWLEDGMENT—The authors wish to thank Mrs. Shirley Earle for her work as technician on this program.

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This study was conducted by the Department of Public Health and Preventive Medicine, the University of Pennsylvania School of Medicine, and the Children's Hospital of Philadelphia, Pa.

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This paper gives a description of the development and operation of a rheumatic fever program in New York City. Emphasis is put on the coordination of activities between the official and voluntary health agencies, and the problems still to be solved.

A COMMUNITY PLAN BY AN OFFICIAL AND VOLUNTARY AGENCY FOR PATIENTS WITH RHEUMATIC FEVER

Katharine Dodge Brownell, M.D., M.P.H.; Margaret A. Losty, R.N., B.S., F.A.P.H.A.; and Helen M. O'Shaughnessey

A LARGE metropolitan area has many problems peculiar to its size and complexity in instituting any public health program which involves securing the cooperation of many agencies. New York City was fortunate, from the earliest days of planning for rheumatic fever prevention, in already having an established pattern of cooperation between the official agency and the voluntary agency most concerned. The Department of Health and the New York Heart Association saw eye to eye on objectives and understood what each could do to aid the other in reaching these objectives.

In order to visualize the plan developed by these two agencies, some knowledge is necessary of their already existing programs relating to individuals with rheumatic fever or heart disease.

The Department of Health provides the school health service in all public and parochial elementary and junior high schools and in about 50 per cent of the secondary schools, serving a total of almost one and a quarter million children. Public health nursing in the schools is provided as part of the department's generalized district nursing services. Procedures for the routine follow-up of handicapped children by the school health service have been in effect for a number of years and consist of the periodic issuing of a special form to the child for completion by the child's physician. There are Health Department diagnostic clinics in each borough to which children up to 21 may be referred by physicians desiring consultation.

A special demonstration program for children with heart disease or a history of rheumatic fever was initiated in 1947 under the joint auspices of the department and the Heart Association in one health district of Manhattan. In 1952, gradual extension to the rest of Manhattan was begun. The program now operates as a regular part of the Health Department's program, though the Heart Association has continued its interest in it. For several years the association made funds available for a public health nurse consultant, and is now giving support to an intensive evaluation of the program. Among the responsibilities of the Manhattan Cardiac

Program are case finding, verification of diagnosis and determination of need for, and referral to, service agencies in the community. Education of the practicing physician and of service agency staff is emphasized. An active registry is maintained as a tool of follow-up. Because of its continuing follow-up and appraisal of the needs of the registered children, the program staff is aware of gaps in community services and areas where there is reduplication of effort or service. This information, when passed on to the Heart Association and Health Department, has been helpful in the development of the plan.

The New York Heart Association, since its organization in the 1920's has worked to raise the standards of care in cardiac clinics throughout the city. Clinics meeting and maintaining standards established by the association are designated as "affiliated" cardiac clinics. At the time planning for rheumatic fever prevention began, there were 73 of these affiliated clinics, more than half of which cared for children.

Members of the Health Department staff serve on a number of policy setting committees of the Heart Association. The director of the Bureau for Handicapped Children has been a member since 1951, of the committee most concerned with the development of community programs. There has always been complete freedom of expression between the representatives of the two agencies and mutual respect for what each is trying to do in the community. Thus, when the need for a rheumatic fever prevention program became apparent, the stage was already set for the closest possible cooperation between the two agencies in its development.

With the publication in January, 1953, of the American Heart Association's statement on rheumatic fever prevention, these two agencies began to concern themselves seriously with the implementation of its recommendations. At this time, the Health Department had been for some months providing a small amount of oral penicillin to one or two children's clinics which had requested it, and was considering limited expansion of this service. It had, however, no funds available for widespread distribution.

It was agreed that good prevention programs in the Heart Association's affiliated clinics, where a majority of New York's indigent and marginal income patients with heart disease receives care, offered the means of preventing a large number of attacks of rheumatic fever, and should be the first responsibility of the association.

A survey of the 73 clinics revealed that some patients in about half the clinics were receiving prophylactic drugs. Almost none of the clinics, however, were following the recommendations of the American Heart Association or had organized programs of prevention. In addition to physician lack of awareness of the desirability and technics of prevention (especially in the adult clinics), there appeared to be two main reasons why so few patients were receiving prophylaxis. The most often stated reason was the high cost of oral penicillin beyond the reach of most clinic patients. Clinic chiefs who were already attempting prophylaxis programs felt the lack of sufficient auxiliary clinic staff to maintain adequate patient follow-up to be an additional important stumbling block. The Heart Association then decided that it would, on a demonstration basis, purchase oral penicillin (later also Benzathine Penicillin G and Sulfadiazine) for clinics which had no other resource for obtaining drugs for patients who could not afford to purchase them. It also agreed to make funds available for grants-in-aid to selected clinics for personnel.

The Health Department decided to merge its beginning drug distribution program with that of the Heart Asso-

ciation so that there would be no duplication of effort in that area, and to concentrate its own efforts on intensifying its case finding, referral and follow-up in the schools and by the Manhattan Cardiac Program, and on promoting through its consultation clinics, the prescribing of prophylaxis by private physicians.

The Department of Welfare was approached and agreed to make oral penicillin available for its clients attending voluntary hospital clinics, and the Department of Hospitals made the drug available in the cardiac clinics of municipal hospitals.

A Joint Committee on Prophylaxis, with representation of the Heart Association, the Department of Health, the Visiting Nurse Service, and of the clinics themselves, and staffed by the Heart Association, has coordinated the plan as it has developed. The committee's functions, in addition, have been to review the existing or proposed prevention programs of clinics applying or reapplying for assistance; to approve the distribution of drugs or grants for personnel to those clinics whose programs meet its standards; and to encourage the development of good prevention programs in those clinics not having them. To aid in evaluating clinic programs report forms were developed and, when indicated, clinics have been visited by committee members or staff.

Early in the committee's career it became obvious that the development of effective clinic prophylaxis programs requires more than merely the provision of drugs. To stimulate clinic chiefs, a series of small discussion meetings were held, led by a physician with experience in rheumatic fever prevention. A pamphlet, "Prophylaxis Programs in Affiliated Cardiac Clinics," was prepared as a guide and distributed to all clinics. To assist the clinics in program organization, Heart Association medical social consultants were assigned. Consultation has been directed toward raising the general standards of care in the clinic, and toward developing the improved follow-up procedures necessary if patients are to remain on prophylaxis. Selected clinics with large caseloads were approved for grants for additional social service or clerical personnel to assist in follow-up. One well organized clinic was given a grant to study the particular problems of a prevention program in an adult, as contrasted to a children's clinic, and the place of a social worker in solving those problems. When, after five years, this grant was withdrawn, the board and administration of the hospital had become so convinced of the key role of a social worker in a clinic prophylaxis program that they unhesitatingly continued the salary for this position.

As a result of the continuing efforts of the Prophylaxis Committee and of the consulting staff of the Heart Association, 74 of the current total of 77 affiliated clinics now have formal prevention programs in which approximately 4,000 patients are reported as receiving prophylaxis. It cannot yet be said, however, that these programs are all equally effective. Many are well organized under enthusiastic leadership, others are haphazard and weak. But as the work with the clinics continues, general standards of care in the weaker clinics is improving, and effective prevention of rheumatic fever becomes more possible. As evidence of this the proportion of rheumatic children known to the Manhattan register who are reported to be on prophylaxis has increased in the last two years from 63 per cent to 76 per cent.

The Department of Health, supplementing the Heart Association clinic program, operates two special prophylaxis clinics under its direct auspices. One was established at the suggestion of the Prophylaxis Committee in a congested low income area in Manhattan

in which there is no affiliated clinic. The other was requested by the practicing physicians of Staten Island for their private patients of marginal income. Both clinics provide diagnostic services and follow-up in addition to drugs. It is of considerable interest that the Staten Island physicians have raised no objections to the clinic's requirement that the diagnosis be verified before a patient is accepted for prophylaxis. This is important, since, in the experience of the Health Department's consultation service and of the Manhattan Program, overdiagnosis of rheumatic fever and of heart disease is a more important problem than is the missing of cases.

In addition to these direct service clinics, the department is responsible for case finding through its school health service, child health stations, the Manhattan Cardiac Program, and through its Cardiac Consultation Service. Children found, not under care, are referred when possible to Heart Association affiliated clinics.

Follow-up to keep patients under care and on prophylaxis has been a concern of the committee from the beginning. In the first instance this is the responsibility of the clinics themselves. Patients must be seen at least every two to three months if they are to adhere to a prophylaxis regimen. If clinics are to be successful in insuring this close follow-up, the prime essential is adequate professional and clerical staff. Also important are well planned and well kept follow-up and diagnostic files. Supplementing the clinics' follow-up of children is that of the public health nurses in the schools, through their routine annual follow-up of all children with a history of rheumatic fever, and through special follow-up at the request of the clinics of individual children on prophylaxis. The Visiting Nurse Service has been helpful in a number of adult clinics in assisting in keeping patients attending regularly. In Manhattan, a third line of defense in the follow-up of children is provided by the Manhattan Cardiac Program which, through its register, attempts to keep track of them as they move, change treatment agencies, or apparently completely disappear.

In spite of the combined efforts of the clinics, the Health Department, the Visiting Nurse Service, and the Manhattan Cardiac Program register and staff, follow-up is far from completely successful. New York City's population is a mobile one and treatment agency shifts are frequent. There is no central registry responsible for follow-up of all patients, adult as well as children. Loss to follow-up is a particular problem among adolescents, especially on transfer from a children's to an adult clinic. At this point the case is closed in one clinic and has not yet been opened in the other. All too often no one assumes responsibility for guiding the adolescent himself from one to the other. Also a problem is the lack of interest in the adolescent rheumatic without heart disease on the part of some adult clinics.

Any program involving many agencies and individuals depends upon continuing educational efforts. The Heart Association has held meetings for physicians and other professional groups. It is hoped—and believed—that knowledge of the importance and methods of rheumatic fever prevention has spread from the hundreds of physicians serving in the affiliated clinics throughout the city to those practicing in the community at large. To assist the clinics in patient education, instruction cards in English and Spanish were prepared. The Health Department emphasizes rheumatic fever and its prevention in its inservice training of its own staff, and patient and parent education through the schools and through its district public health nursing services. It plays its part in physician education through

distribution of the American Heart Association's prevention statement, and through the direct contact its cardiologists make with private physicians for whose patients prophylaxis is recommended.

Two situations in New York City today—probably common in other large cities as well—make program educational efforts particularly difficult. First is the constantly shifting agency personnel, both professional and nonprofessional, making inservice training a never-ending undertaking. Trying to keep up with it takes—in the words of the Red Queen—"all the running you can do to keep in the same place"! Second, patient education is complicated and made immeasurably more difficult by the presence of large numbers of non-English speaking individuals in the groups most needing public health assistance. In Manhattan almost 40 per cent of the registered rheumatic children are Puerto Rican, most of whose parents speak little or no English. Ways must be found to solve both of these problems more effectively.

Though the present plan for rheumatic fever prevention in New York City reaches a large proportion of its most needy patients, very real gaps in services exist. Patients of marginal income under the care of private physicians are not reached at all under the present plan except in one small borough. Because of the follow-up provided by the school health service and the Manhattan Cardiac Program, children are far more effectively served than are adults. There is no one agency assuming administrative responsibility for insuring preventive services to all in the community who need them—if there were, the current "plan" might be called a "program." The time has come to consider next steps.

From the start, the Heart Association has looked upon its material assistance to clinics as a temporary expedient. It has considered it a pump-priming operation in the clinics to spur them to develop active prophylaxis programs of high quality, and, in the community, as a stop-gap operation until more appropriate agencies would take over the financial responsibility for the provision of drugs for those who could not afford them, and for the essential follow-up services. The Health Department from its initial supplying of penicillin to a few clinics in 1952 has recognized its responsibility for rheumatic fever prevention and has played an active role in developing and implementing the present plan. Both agencies realize that they now need to involve more deeply other agencies in the community in planning for the future.

Recently, a half-day meeting was held which was attended by representatives of the Health Department and the Heart Association, the Departments of Hospitals and Welfare, the administration and clinical services of the voluntary and municipal hospitals, and of the Greater New York Hospital Association and the Visiting Nurse Service. This meeting was called to review what has already been accomplished, and to consider plans for continuing and expanding the program. As a result of this meeting, a subcommittee is now developing future plans in more detail. This committee will, it is hoped, raise, and answer, such questions as:

How large and important is the rheumatic fever problem in New York City today?

Is there a continuing need for a public health program of secondary prevention, or should efforts be shifted to primary prevention?

Whose responsibility is it on an on-going basis to coordinate the activities of the many agencies involved in rheumatic fever prevention in a large city?

How can coordination best be accomplished?

What would be the cost of an effective city-wide program of prevention—to the official agencies?—to the voluntary agencies?

And finally—How should such a program be financed?

When answers to these questions are available, the Department of Health and the New York Heart Association look forward to participating with others in the development of a city-wide "program" for rheumatic fever prevention.

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This paper was presented before a Joint Session of the American Heart Association, the American School Health Association, and the Maternal and Child Health and Public Health Nursing Sections of the American Public Health Association at the Eighty-Seventh Annual Meeting in Atlantic City, N. J., October 22, 1959.

Additions to the Association's Archives

The historical archives of the Association have been enriched by a recent contribution from John F. Norton, Ph.D., a former chairman of the Subcommittee on Standard Methods for the Examination of Water and Sewage, now in retirement at Tryon, N. C. His gift was a first edition of "Standard Methods for the Examination of Water and Wastewater," as it is now known in its eleventh edition. When first published it was "Standard Methods of Water Analysis" and represented the report of the Laboratory Section committee bearing the same name. Appearing initially in the supplement number 1, May, 1905, The Journal of Infectious Diseases—a copy of which accompanied the gift—it was later published as a separate volume.

The Association would like to build up a complete file of APHA publications and is particularly happy to now have the first edition of Standard Methods. APHA would welcome donations from generous readers of similarly hard to come by editions of its earliest works.

A state-wide program for the prevention of rheumatic fever is described below. As in the preceding paper, the cooperative nature of the activity is emphasized, as well as the importance of education and follow-up.

OPERATION OF A COOPERATIVE STATE-WIDE RHEUMATIC FEVER PREVENTION PROGRAM

Nicholas P. R. Spinelli, M.D.; Horace A. Brown, M.P.H., F.A.P.H.A.; and Nicholas J. Lavnikevich, M.P.H.

DURING the past 15 years, the prevention of recurrences of rheumatic fever in the known rheumatic subject by the daily and continuous prophylactic use of antimicrobial agents has firmly established its effectiveness.

Despite the widespread and enthusiastic reports in the medical literature of the value of sulfonamide and penicillin prophylaxis in the prevention of streptococcal infections, it was apparent in the early part of this decade that such therapy had not gained widespread acceptance among community physicians generally.

In 1954, the Connecticut Heart Association appointed a committee of physicians to evaluate this problem in Connecticut and to formulate a practical working program to expedite the utilization of these effective drugs. After two years of intensive planning, such a program was inaugurated on a state-wide basis in June, 1955. This report is a summary of our four-year experience in this public health effort.*

In the preliminary planning phase, the committee concluded that the two major stumbling blocks to widespread utilization of prophylactic drugs were: (1) Inadequate dissemination of scientific information to the practicing physician, and (2) "prohibitive cost" of the recommended prophylactic drug to the patient.

The first problem was tackled immediately prior to the program's inception by intensive professional education

* Recognizing that effective education toward widespread acceptance of the concept of rheumatic fever prophylaxis could be intensified and perhaps only accomplished through a concurrent service program to overcome practical barriers, the Education Committee of the Connecticut Heart Association recommended in 1953 that a special committee be formed to implement this new facet of medical knowledge.

This progress report reflects the combined efforts of many medical and nonmedical members of the Heart Association and cooperating agencies, working with the assistance of experienced public health staff. The result has been a state-wide program, conforming to business and professional ethics, and administered with a degree of precision that has achieved enthusiastic participation of thousands of persons—anyone of whom might have turned the direction toward confusion and eventual failure, rather than the success which it has been.

Leadership of the Rheumatic Fever Committee has been by: Dr. William J. Lahey, director, Medical Education, St. Francis Hospital, Hartford, Conn., 1954-1956; Dr. Harold Lehmus, internist, Manchester, Conn., 1956-1957; Dr. N. P. R. Spinelli, internist, Stratford, Conn., 1957-1959; Dr. Clifford Joseph, pediatrician, Torrington, Conn., 1959-.

on a state-wide basis and, more important, on a community level under the direction of the committee physician representative from each chapter of the Connecticut Heart Association.

The second problem required careful development and negotiation. The prophylactic drug chosen was one 250,000 u tablet of buffered penicillin G daily, as recommended by the Council on Rheumatic Fever and Congenital Heart Disease of the American Heart Association.[1] Through negotiation with the organized pharmaceutical profession, wholesale drug houses, and from the selection of a penicillin supplier from bids received, it became possible to make the drug available to the patient at the approximate cost of $1 per month.

The intent and the philosophy of the parent committee's recommendation were threefold: (1) a continuing process of physician education, (2) a service to the rheumatic subjects of Connecticut, and (3) maintaining by every means possible the normal patient-doctor-pharmacist relationship.

The cooperation and enthusiasm of both the physician and pharmacist was the crucial fulcrum upon which the continuous success of this program rested. The cooperation of the Connecticut Pharmaceutical Association was achieved so that the rheumatic patient was able to purchase his prophylactic drug at low cost at his corner drug store. The enthusiasm of physicians grew as they realized our promotion was through the profession, not the press. Our program has functioned for four years as a joint effort of the Connecticut Heart and Connecticut Pharmaceutical Associations, with endorsement of both the State Medical Society and the State Department of Health.

Early in our planning we concluded that the patient's economic status should not be a factor in his eligibility for the drug. For the very few who could not afford even the modest cost of our program the Connecticut State Department of Health agreed to provide free penicillin under the same dosage and time schedule. We have, therefore, stated for the past four years that no one in Connecticut need be without prophylaxis against recurrences of rheumatic fever because of financial reasons.

In effect, any individual who has had rheumatic fever in the past may obtain a continuous supply of penicillin at low cost upon the recommendation of his physician and upon the latter's application for it to the Connecticut Heart Association. Seventeen chapters of the Connecticut Heart Association participate in the support and operation of the program and provide information and materials to every physician in Connecticut. The burden of responsibility for accuracy of diagnosis and the need for prophylaxis is delegated largely to the referring physician. In its barest outline, the working mechanics of our program are as follows. A physician desiring prophylactic penicillin for a rheumatic patient submits an application to the administrative office of the Connecticut Heart Association.

The physician is requested to check the criteria which are the basis of his diagnosis of acute rheumatic fever, according to Jones Criteria (Modified).[2] These facts allow the Rheumatic Fever Committee, to a degree at least, to assess the accuracy of diagnosis. This outline also serves as a refresher mechanism for professional education.

Upon receipt of this application in the state office of the Connecticut Heart Association, a pad of four prescriptions coded for the specific patient is forwarded to the applying physician. This represents a year's supply of prophylactic penicillin at the recommended dose. Prescriptions are honored by every pharmacy in Connecticut, which is afforded prompt delivery of the special Heart Association penicillin by his wholesaler. A stub appended to each

prescription, which also carries the patient's code number, is forwarded by the pharmacist to the wholesale druggist who then releases a bottle of the special penicillin to the retail pharmacist. The coded stubs are returned weekly by the wholesalers to the Connecticut Heart Association office. In this manner, the administrative staff has in each patient's file a record of his performance in the maintenance of his prophylaxis. When the stub of his fourth prescription is received, a reapplication form is automatically sent to his physician, upon the completion and return of which a pad of prescriptions for the ensuing year is forwarded. The reapplication form requests information relative to the patient's progress, cooperation, and particularly data pertinent to streptococcal infection and/or recurrence of rheumatic fever during the year past. The functioning of this administrative system has been remarkably efficient during the past four years.

The cooperative working relationship established in this program between the Heart Association and the members of the medical and pharmaceutical professions has been of a high order. This was achieved by a combination of good basic community organization, good public relations, and meticulous attention to every aspect of administrative detail.

Vital to the continued healthy function of our program has been the role of the working Rheumatic Fever Committee, which has continued to serve since the days of initial planning in 1953. Originally comprised of physicians representing the chapters of the Connecticut Heart Association and members of the Connecticut State Department of Health, in the ensuing years it has grown to include representatives of the Pharmaceutical Association and public health nurses from official and voluntary agencies. It has been the responsibility of this committee to evaluate the validity of applications whose diagnostic accuracy was in question. The evaluation of reported recurrences of acute rheumatic fever by participating physicians has been a major task assigned to the medical members of the group. Each reported recurrence is assigned for investigation to the committee physician in whose community the reporting physician resides. Detailed clinical facts are thus obtained by the investigating committee member by personal contact with the attending physician. The effectiveness of this physician-to-physician contact in promoting continued professional education has been most gratifying.

The problem of delinquency in continuity of prophylaxis has been a major one and has been the subject of considerable committee discussion and effort, as will be noted later.

The results of our four-year program might best be presented by a brief summary and discussion of the statistics which follow. Statistical control has been maintained with Keysort punch cards.

As of June 1, 1959, 5,927 applications had been processed upon the request of 1,061 physicians in Connecticut. The latter figure represents about one-half the Connecticut physicians who might be expected to see rheumatic patients. Only 41 per cent of our patients have been under 20 years of age, so that far over half are adults with rheumatic heart disease. By far the largest group, 33 per cent, have been in the 25- to 44-year-age group, or that age when rheumatic heart disease most commonly makes itself clinically manifest; 57 per cent of our patients have been female, and the fact that 65 per cent of the patients in the age group 25 to 44 have been women, suggests that pregnancy is a strong factor in the case finding of rheumatic heart disease.

Although we have been gratified by

the statistics we have quoted, and by the corollary physician interest these figures represent, the figures of delinquency by the patient in the maintenance of prophylaxis have been unfortunately equally impressive. Failure to follow physicians' instructions is a large and general problem. The nature of our program is such that the responsibility for the supervision of continuity of prophylaxis rests with the family physician, and something over which our committee has no direct control. It was found that by September, 1958, when our program had been functioning over three years, 41.1 per cent of all patients were to some degree delinquent, and 42 per cent of these had not filled a prescription for at least one year! At that time, to aid the busy physician in the important task of achieving the vital end of continuous prophylaxis, a procedure of reporting to each physician those of his patients who were delinquent was begun. These reports have been continued at intervals of every four months, and have afforded an added and excellent liaison between the committee and the referring physician. Those patients who had died, moved to other states, or had otherwise been lost to physician follow-up were found to comprise a significant portion of this presumed delinquent group. The physician's cooperation in voluntarily responding to these reports has been excellent and is an index of the increasing enthusiasm for the program which the participating physicians of Connecticut have manifested. Probably largely a result of this effort, the delinquency rate had dropped to 34.8 per cent by January, 1959. After a physician had received three such delinquency reports on the same patient, and if there was no response from the physician, it was decided to automatically drop from the program those patients who had not filled a prescription for a year or longer. As a result of this procedure, by June, 1959, our net enrollment was 4,039 patients, only 23.7 per cent of whom were delinquent to any extent.

While these measures have properly served to alert the family physician to the magnitude of his patients' delinquencies, it seemed obvious that a more positive and aggressive program was needed to aid the physician. That the community public health nurse might help to fill this need seemed obvious, and during the past year planning for just such a program has progressed. It is hoped that in 1960 the public health nurse, with the consent of the family physician, may reach not only the delinquent members of the patient load, but may also establish liaison with each new enrollee in the program at the onset of his experience with prophylaxis. This phase of our program is being planned as a controlled experiment, so that valid statistical data referable to the effectiveness of such service may be obtained. Consultation and cooperation in this enterprise is being afforded by the Heart Disease Control Program and the Division of Public Health Nursing of the Public Health Service.

The final and obviously most pertinent statistics relate to the incidence of rheumatic fever recurrences which have been reported. Education of the physician in the investigation of, and reporting to the Heart Association of suspected recurrences has been an intensive and continuous part of our program. Such reported recurrences are personally followed up by individual physician members of the committee for the complete clinical details of such suspected recurrences. The ultimate decision is based on the opinion of a majority of the committee. To date, our documentation of bona fide recurrences has been surprisingly low. Of 36 reported cases, which have been investigated, 11 have been felt to be definite failures of our prescribed regimen; eight seem-

ingly true recurrences have occurred while the patient had been delinquent in the maintenance of his prophylaxis; and in 17 cases the reporting physician was unable to supply sufficient clinical or laboratory data upon which a valid decision might be based. In the latter instances, it is felt that the process of family physician interrogation has served a pertinent educational end. We are well aware that our figures do not accurately describe our achievement in the area of rheumatic fever recurrences. They are gratifying enough, however, to make us feel that an effective measure of our desired goal is being achieved.

Of particular interest to us has been the experience of the Division of Laboratory Services of the Connecticut State Department of Health in relation to streptococcal culture specimens submitted by Connecticut physicians.[3] In 1954, a total of 1,415 such specimens were processed; and in each succeeding year, the requests for such service approximately doubled. The projected estimate of the number of streptococcal cultures that will have been reported in 1959 is 27,276, or approximately a twentyfold increase since 1954. Since there have been no corresponding increases in other laboratory services offered, it is strongly suggested that this phenomenon has been an outgrowth of our physician education efforts, and that the Connecticut physician has become more streptococcus conscious. These figures offer wholesome implications relative not only to prevention of recurrent rheumatic fever, but to prevention of the primary episode of the disease as well.

The basis for maintaining physician interest in our program has been the low cost of the penicillin provided for his patient. It is probable that in the foreseeable future, the retail price of this drug will drop to the modest levels now provided by our special arrangements, and that the need for and the existence of our program will end. The results of our educational effort will then be apparent. We firmly believe that the concept of prophylaxis in the medical management of the rheumatic patient will continue at a higher level than could have been otherwise achieved.

The future direction of our program is currently a matter of committee planning. The possibility that certain elements of the program will in some manner be perpetuated by the State Department of Health, under whose aegis it ultimately most properly belongs, seems logical. In the meantime, the never-ending process of physician education continues, and thousands of Connecticut's citizens who have had rheumatic fever are daily taking prophylactic drugs which otherwise they probably would not have received.

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At the time of the presentation of the paper the authors were, respectively, chairman, Rheumatic Fever Committee; executive director; and program director, Connecticut Heart Association, Hartford, Conn.

This paper was presented before a Joint Session of the American Heart Association, the American School Health Association and the Maternal and Child Health and Public Health Nursing Sections of the American Public Health Association at the Eighty-Seventh Annual Meeting in Atlantic City, N. J., October 22, 1959.

This description of the Michigan program for control of rheumatic fever emphasizes the need for cooperation of agencies and coordination of effort. In addition, the author stresses the key role of the family physician and the need for education of the family.

ADMINISTRATIVE PHASES OF A RHEUMATIC FEVER PROPHYLAXIS PROGRAM ON A STATE-WIDE BASIS

Carleton Dean, M.D., M.P.H., F.A.P.H.A.

In 1943 the Michigan Crippled Children Commission, with the financial aid of the Children's Bureau, established in seven counties of the Upper Peninsula of Michigan "A Program for the Care of Children Suffering from Rheumatic Fever and Heart Disease." Although the Children's Bureau had assisted in the establishment of Rheumatic Fever Programs in other states, they were predominately in urban and large city areas, while our program was established as a pilot study to provide Sulfadiazine prophylaxis to rheumatic children living in rural and sparsely settled areas. Our objective was "to secure adequate care and treatment for children afflicted with heart disease and allied conditions, and include such preventive steps as may be possible and indicated by our present knowledge of the etiology and epidemiology of these conditions." To assist in accomplishing this objective, the program offered consultation service to the family physician in diagnosing rheumatic fever, itinerant clinics, and education to local nurses and families in the necessity for early treatment and preventive measures.

At that time, in the seven counties selected for the pilot program the commission had on its register approximately 500 recorded cases of rheumatic fever ranging in age from birth to 21 years. These cases were known to the commission because in the years before this special program, the commission had provided hospital and convalescent care for all cases of rheumatic fever in this age group, whose families were totally or partially unable to finance needed hospital treatment.

The favorable results obtained during this pilot study convinced us that it was feasible to carry on a state-wide Prophylaxis Program in rural as well as urban areas to prevent recurrences of rheumatic fever by controlling the possible recurrence of streptoccal infections. In anticipation of the termination on June 30, 1955, of our pilot program in the Upper Peninsula, and because of the satisfying experience which resulted from that program, the commission was stimulated to consider establishing a state-wide Rheumatic Fever Prophylaxis Program for children under 21 years of age.

The commission was further stimulated to undertake a state-wide program by the recommendations for the prevention of recurrences of rheumatic fever through control of Group A Beta Hemolytic Streptococcal infections of the

Committee on Prevention of Rheumatic Fever and Bacterial Endocarditis of the American Heart Association.* These recommendations were for continuous year-round administration of one of the following drugs to patients who had already had one or more attacks of rheumatic fever, or who showed clinical evidence of rheumatic heart disease:

a. Sulfonamide—daily by mouth, or
b. Penicillin—daily by mouth, or
c. Benzathine Penicillin G—monthly intramuscularly.

Methods (a) and (b), while successful when properly executed, are dependent on patient cooperation and are sometimes unsatisfactory because of negligence or irregularity of medication. Method (c), the monthly intramuscular administration of Benzathine Penicillin G, has some definite advantages over the other two methods because (1) it guarantees that the patient is actually receiving the medication; (2) it tends to maintain a more stable blood-level of penicillin; and (3) the method requires a monthly visit to the doctor's office thereby affording an opportunity for closer supervision and better follow-up, an objective otherwise difficult to attain.

Therefore, in January, 1956, the Michigan Crippled Children Commission and the Michigan State Department of Health established a joint state-wide prophylaxis program for the control of streptococcal infections in patients having had one or more attacks of acute rheumatic fever. The program is divided into two phases: (1) the State Department of Health is responsible for the free distribution of Benzathine Penicillin G and Sulfadiazine to physicians for use in any case having been previously diagnosed as having rheumatic fever; and (2) the Michigan Crippled Children Commission is responsible for financing medical supervision in the local doctor's office of the monthly administration of the Benzathine Penicillin G to rheumatic patients under 21 years of age who have been under the commission's regular hospital program.

The program, on the commission level, was designed to afford an opportunity for children who have had rheumatic fever to remain under medical supervision, and to receive, as recommended, monthly check-ups and injections of Benzathine Penicillin G or other therapy, for the eradication or prevention of the streptococci from the throat (secondary prevention). It was hoped thereby perhaps to reduce hospital periods for acute phases of rheumatic fever in children. In addition to the two agencies mentioned above the program is also supported by the Michigan State Medical Society and its Rheumatic Fever Control Committee, whose initial support and interest has been continued.

The success of any State-Wide Rheumatic Fever Prophylaxis Program depends on obtaining the interest and cooperation of the local family physician who plays the key role. Usually he is the first person to see the member of a family who develops a streptococcus infection or rheumatic fever. The child is his primary concern at all times and in accepting his responsibility as the family physician, he counsels the family (and child) regarding the outline of services to be followed. The physician knows whether or not cardiac damage exists, and if present, how severe it is; thus he is able to advise the parents regarding a planned regime for the child. Furthermore, the family has confidence in his advice and ability, and is more apt to initiate and continue the prophylactic treatment under his supervision. In addition, he usually has his office in the locality where the child lives, so that it is more convenient for the parents as far as time and travel expense are concerned. Free choice of physician is granted the family, in case

* Published in Circulation Vol. XI (Feb.), 1955.

they do not desire the physician who treated the child in the initial attack, or in case the family moves to some other locality. It has been gratifying to see the interest of the medical profession in following the rheumatic fever children that are or have been under their care. The reaction on their part has been excellent.

In Michigan, Rheumatic Fever Diagnostic Centers of the Michigan State Medical Society are available for consultation service when requested by family physicians. The Diagnostic Centers are usually located in the Out-Patient Department Clinics. They are manned by qualified specialists who utilize the hospital facilities for laboratory work, x-ray electrocardiographic studies, and so forth. Ordinarily the diagnostic team consists of a pediatrician or internist (cardiologist), a roentgenologist and other medical specialists. These centers may be used to check unconfirmed cases so as to confirm or to rule out rheumatic fever. All reports and recommendations are sent back to the family physician referring the case. If the diagnosis is confirmed, the family physician supervises the recommended prophylactic treatment.

Indigent and borderline economic cases may be sent to the Diagnostic Center and the commission will pay the costs of laboratory service and/or hospitalization, when necessary, in cases eligible for financial assistance. In cases where the family is in a position to pay a consultation fee, the fee is set by the individual diagnostic group.

An essential supporting role in the success of a program such as this, is played by the parents, who must be informed of the necessity of prophylaxis. Their attitude toward prophylaxis is based upon their adequate understanding of its importance, thus motivating them to accept and cooperate in the prophylactic regime. Their understanding will be reflected in the extent of their cooperation and acceptance of their responsibility. The emotional effect upon the child who receives monthly injections must also be taken into consideration. This is an area which should be studied to determine if the child's emotional reaction plays a part in the effectiveness and acceptance of the program.

A register of rheumatic fever cases is an essential agency tool for adequate program guidance both in initiating and maintaining continuity of service. To be effective, the register must contain:

1. A current and running record on those children who have been diagnosed as having had one or more attacks of acute rheumatic fever and who are (a) under prophylactic treatment, or (b) who require follow-up in order to place them under prophylaxis.
2. A record of those children who are reported as having had rheumatic fever, but who require follow-up and referral to a Rheumatic Fever Diagnostic Center for confirmation of the diagnosis and recommendations for prophylactic treatment.

When our state-wide program was started, the commission screened its Crippled Children Case Register (maintained on IBM cards) and set up a register composed of those rheumatic fever cases which were previously hospitalized by the commission. Those cases were reviewed and the family physician was contacted to ascertain his desire to institute prophylaxis with monthly injections of Benzathine Penicillin G. If he agreed, the child's parents were contacted to find out whether or not they would agree to have monthly injections administered to the child by their family physician. If the family was willing, the county health department helped them to arrange an appointment with their doctor. This procedure continues to be followed as new cases of rheumatic fever become known to the commission.

When a child who has been receiving prophylaxis under the Michigan Rheumatic Fever Prophylaxis Program dis-

continues treatment, the commission tries to find out why the treatment has been stopped. The following method is used:

1. A letter is sent to the doctor and he is asked if the monthly injections have been discontinued on his advice or for other reasons. (A carbon copy of this letter is sent also to the county health department.)
2. If the doctor replies that treatment has stopped because the patient no longer keeps his appointments, the commission writes the family (sending a carbon copy to the county health department) calling their attention to the importance of regular monthly prophylactic treatment and encouraging them to resume visits to the family physician. The county health department, having received a copy of such letter, also contacts the family to point out the importance of continuing treatment.
3. If the doctor replies that the family has moved, efforts are made by the commission through the county health department to obtain the family's new address. When the address is received, a letter is sent to the family asking for the name of their new family physician so that he may be contacted regarding continuation of the prophylaxis program.
4. If the doctor replies that further monthly treatments are not necessary, the commission removes the case from its active Rheumatic Fever Register.

An analysis of the Michigan Crippled Children Commission's Rheumatic Fever Register and its follow-up procedures during a six-month period, January 1, 1959, through June 30, 1959, revealed the following:

371 children were receiving Benzathine Penicillin G
22 children were receiving Sulfadiazine

393 Total children receiving treatment under the commission's jurisdiction, 85 of which were started on a prophylaxis regime after January 1, 1959

Excluded from the total of 393 cases are 50 cases which were dropped from the program for the following reasons:

10 Patients discontinued making visits to their doctor.
10 Moved and were unable to be located.
9 Changed to different drugs not provided under the program.
9 Doctors discontinued treatment.
3 Attained age 21 (age limit of MCCC program)
3 Married
1 Transferred to private-pay basis.
1 Died
1 Entered Military Service
1 Allergic to both drugs supplied under the program.
1 Further treatment not indicated. (Had been on program for two years.)
1 Treatment temporarily discontinued by doctor.

For those children eligible for its assistance, the Michigan Crippled Children Commission participates financially in this program to the extent of paying the family physician a fee of $3 for the monthly check-up and administration of the Benzathine Penicillin G, or Sulfadiazine prophylaxis, and in addition, for indicated laboratory service provided in the doctor's office.

The following expenditures have been made for these services:

1956	$1,741.00
1957	$6,652.00
1958*	$7,991.30
January, 1959, through September, 1959	$5,943.50
Total	$22,327.80

* The expenditures for the year 1958 covered the following:
349 children on Benzathine Penicillin G
20 children on Sulfadiazine prophylaxis
229 doctors who participated in service to the children treated
4 clinics which participated in service to children

The success of a state-wide prophylaxis program such as is carried on in Michigan is dependent upon four essential elements:

1. Cooperative efforts of the coordinating agencies sponsoring the program—namely the Michigan Department of Health and the State Crippled Children Commission.

2. Availability of diagnostic and consultation centers.
3. Understanding and cooperation of the practicing physicians in the communities.
4. Understanding and interest of parents in the importance of regular monthly prophylaxis treatment for their child.

The effectiveness of the latter two elements are based upon an active and continuing educational program. It is in this area that public health personnel can contribute extensively to the success of any state-wide or community program to reduce the recurrence of rheumatic fever through the control of streptococcal infections.

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This paper was presented before a Joint Session of the American Heart Association, the American School Health Association, and the Maternal and Child Health and Public Health Nursing Sections of the American Public Health Association at the Eighty-Seventh Annual Meeting in Atlantic City, N. J., October 22, 1959.

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Further information from John F. Ege, Jr., Director, Industrial Hygiene and Safety Division, Argonne National Laboratory, 9700 South Cass Ave., Argonne, Ill.

This paper presents some principles of research design that can guide the planning of design of public health investigations. They are illustrated in terms of a project actually carried out by one of the authors.

SOME PRINCIPLES OF RESEARCH DESIGN IN PUBLIC HEALTH

Irwin M. Rosenstock, Ph.D., F.A.P.H.A., and Godfrey M. Hochbaum, Ph.D.

RESEARCH is a planful and systematic activity directed at the discovery of new facts or at the identification of relationships among facts. It attempts to achieve these objectives in a manner that will insure that the data obtained can be generalized, that is, can be applied to a wider range of situations than the one studied, and that the data are not influenced by the conscious or unconscious bias of the investigator or by any other extraneous factors. Scientific research insures that its findings are generalizable and that they are maximally free of bias by systematically employing scientific research methodology.

Scientific research is thus defined in terms of its objectives (discovery of facts and identification of relationship between facts) as well as in terms of its methods (assuring both generalizability and validity of the findings). The mere application of technics from the armamentarium of scientific research in the absence of the research objective does not stamp an activity as scientific research. Conversely, striving after the discovery of facts without employing scientific methodology is not scientific research although it may serve valuable purposes.

Life History of a Research Project

In this article we present some principles of research design. While the discussion cannot be comprehensive, it may serve as a guide for the planning and design of administrative research in public health. In order to invest these principles with the greatest possible meaning for health workers, their use will be illustrated by a description of the life history of a particular research project which was actually carried out.* Although the study selected is in the field of social science, the principles to be illustrated are equally applicable to research in any field.

1. Formulating the Problem

The study grew out of Public Health Service experience with x-ray case-finding activities in the field of tuberculosis. In the late 1940's and early 1950's, the Public Health Service was intensively involved in demonstrations designed to improve case finding in tuberculosis. Programs were conducted in many localities in which the total adult popu-

* Hochbaum, G. M. Public Participation in Medical Screening Programs: A Socio-Psychological Study. Department of Health, Education, and Welfare, PHS Publ. No. 572, 1958.

lation was urged to come in for x-ray screening. The extent of public participation varied considerably from place to place, but, in general, did not achieve the high level desired by program planners. Moreover, presumptive evidence was obtained that the incidence of tuberculosis was probably higher in groups that did not appear for screening than in groups that did.

In 1951, officials of the Tuberculosis Program of the Public Health Service and representatives of the National Tuberculosis Association met with members of the Behavioral Studies Section for the purpose of considering ways of increasing public participation. However laudable this objective was, in and of itself, it was not immediately susceptible to research for reasons to be described later. Much more detailed analysis was necessary before research could be planned.

The Tuberculosis Program officials were asked for their best hunches concerning the nature of the problem. A variety of reactions was obtained. We learned, for example, that every concerted effort had already been made to inform the population in surveyed localities. We further learned that in so far as possible, mobile x-ray units used for the programs had been placed in convenient neighborhood locations; that their hours of operation generally were set to fit in with the living habits of the local population; that cost was not a factor since the x-rays were provided free of charge; that for the individual, obtaining the x-ray was a quick procedure which did not require much of his time. Factors such as knowledge, cost, time, convenience, and the like had one important characteristic in common. They all dealt with potential barriers against participating in the screening program; failure to plan adequately for any of these factors might have prevented some people from coming in. For example, if a unit had operated only during week-day working hours, it may be expected that a large proportion of working individuals could not have participated in the program. If the x-ray had involved cost to the individual, it might be expected that poor people would have stayed away. It became clear in discussions with program officials that they were implicitly asking for the identification of still other barriers that might prevent people from accepting screening and which they had perhaps overlooked. In short, they were implicitly asking for a study around the question: "Why, despite our best efforts, are some people still not coming in for screening?" This type of question almost presupposes that if it were possible to remove all barriers of the situational kind—that is, cost, time, location, and any others that might be identified—everybody would come in for screening.

The principal investigator on the project, a trained social psychologist, had good reason however not to accept this assumption. His training led him to reason that while situational barriers are important in inhibiting desired action, their removal will not provide the positive forces needed to take action. These positive forces are in fact motives or drives. It seemed clear that even if all situational barriers to taking action were removed, a significantly large proportion of people might still not utilize the opportunity for screening simply because they were not motivated to do so.

Hochbaum's approach was to turn the question around. Instead of asking why people are not coming in for screening, he chose to direct his attack to the question: Why are people coming in for screening? By asking the question in this way, he was insuring a concern with the positive forces that impel people to take action and thus avoided limiting the study to factors which might prevent it.

Before work could continue, it was

necessary to consider whether the research question was capable of being answered under the existing conditions. The failure to ask whether a proposed problem is in fact susceptible to systematic research is a most commonly committed error. To judge whether a problem is susceptible to sound research, one must first ask whether the ultimate purpose of the research is in principle capable of being achieved; second, whether a solution to the research problem as stated would contribute to the achievement of the ultimate objective; and finally, whether the research methods to be employed are likely to yield data that will answer the research question. In the case-finding study, the conclusion was that the problem was clearly susceptible to research because in principle greater success in case-finding programs was obtainable, because an analysis of why people were coming in for x-ray seemed likely to provide a basis for increasing program success, because there was an adequate supply of available persons who had had a recent opportunity to participate in the program, because methods were available or could be adapted for studying motives, and because there were available the necessary resources to do the job in terms of skilled researchers and adequate financial backing.

One of the most common consequences of the failure to consider analytically the question, "Is this problem subject to systematic study?" is the tendency to undertake more than one can do in a given research project, either by proposing to do much more than can reasonably be expected of any limited research or by proposing to solve highly complex issues with most inadequate methodology. We may call the latter approach "shooting bears with BB guns."

2. Review of Literature

After formulating the research problem, a rather comprehensive review of the literature was undertaken. The literature review concerned (1) any studies made in connection with tuberculosis and other screening programs, and (2) methodological work concerned with obtaining personal information from people. The review failed to uncover any previous research which had approached the problem from the point of view of the present study. However, some leads were provided by comparable work done in content areas other than tuberculosis which could be used as a basis for improving the present design.

3. Formulating Hypotheses and Making Assumptions Explicit

The principal investigator then formulated a series of hypotheses as explicitly as possible. It is not possible here to cover the hypotheses in detail. In general they concerned, first, the individual's psychological readiness to participate in the screening program (itself based on three separate psychological factors); second, the role of situational factors in facilitating or inhibiting the readiness; and, third, the role of certain cues or stimuli to action.

A common misconception exists that hypotheses consist of assertions which the investigator is bound and determined to prove at all cost. In reality, hypotheses, however they are formulated, are nothing more than hunches or ideas about the findings that may be expected. They are to be tested in the research — not proved by the research. Every effort is made to obtain data concerning a hypothesis or hunch which can as likely disprove the hypothesis as prove it. Or data may be obtained which will lead, if so indicated, to revision of the original hypothesis.

A hypothesis may be stated in declarative terms, e.g., "There is a difference in intelligence between groups 1 and 2." It may be stated as a null hypothesis, e.g., "There is no difference in intelli-

gence between the groups." Or the hypothesis may be stated as a question, e.g., "Is there a difference in intelligence between the groups?" The form in which a hypothesis is stated is not as important as the clarity of the statement.

In the case-finding study, the attempt was made to define the hypotheses operationally, which means defining them in terms that are measurable. A term such as "health consciousness," for example, is not measurable without further definition, while a term like "visiting the physician within some specified period of time" is measurable. In the attempt to formulate hypotheses operationally in the case-finding study, it was necessary to define certain terms that might not at first seem to need much further definition. Consider, for example, the phrase: the act of obtaining a chest x-ray.

Practically all other studies of participation in x-ray screening programs had merely dichotomized individuals according to whether they had or had not obtained x-ray within a specified period of time. Obtaining an x-ray might appear to be fairly explicit but in reality it is not specific enough. What, in fact, do we really mean by obtaining? Is the food handler who is compelled to obtain a chest x-ray behaving in a way that is similar to the person who without compulsion obtains the x-ray? Is the person who obtains the x-ray to screen for tuberculosis behaving similarly to the person who does so when concerned with heart disease or lung cancer? Is the person who obtains x-ray only after the appearance of suspicious symptoms taking the same action as the person who obtains it in the absence of symptoms? Is the person who obtains the x-ray at a mobile unit behaving in a way similar to the person who turns to his physician or to the hospital? The action itself appears identical on the surface, but the motivation, the context, the very nature of the behavior can be regarded as very different. This consideration led to defining the phrase, "obtaining a chest x-ray," in terms of four factors: (1) whether the x-rayed person had voluntarily obtained a chest x-ray without compulsion or pressure, (2) under what specific circumstances he had sought x-ray, (3) to what kind of x-ray facility he had turned, and (4) the time period in which he had obtained x-ray.

4. Specification of Needed Data

Following the definition of terms used and a formulation of explicit hypotheses, it was necessary to specify precisely the kinds of data that would have to be obtained to test the hypotheses. A single example will show how a particular hypothesis was analyzed to identify the kinds of data that would be needed. Under the general category of "psychological readiness to obtain x-ray" one specific hypothesis dealt with beliefs concerning the possibility of being sick in the absence of symptoms. It was hypothesized that, other things being equal, people would be more likely to accept a chest x-ray voluntarily if they truly accepted the fact that they might be suffering serious illness (tuberculosis) while feeling perfectly well and free of symptoms. Now, to the uninitiated it might seem that this hypothesis could be tested by obtaining one simple piece of data, namely the person's reactions to a question such as: "Do you think you could have tuberculosis without any symptoms and while feeling in the best of health?" Fortunately, it was recognized that a spuriously high proportion of people would probably respond in the affirmative to such a question. People may accept a fact intellectually while rejecting it emotionally. Thus, an information-type question was incorporated in the questionnaire; but care was taken to include other questions that would tap the depth of the respondent's emo-

tional conviction on the same point. This dual approach to obtaining certain personal information will be discussed in more detail in the following section. The central point of this section is that each and every hypothesis and each and every part of the hypothesis had to be subjected to careful scrutiny for an analysis of the specific data that would have to be obtained in order to test it adequately.

5. Selection of Methods and Technics to Yield Needed Data

By this time in the history of the case-finding project, the ultimate purpose had been identified and the research problem had been defined. Relevant literature had been reviewed and assumptions, definitions, and hypotheses had already been made explicit and defined in measurable terms. Finally, the detailed data that would be needed to test the hypotheses were specified. At this point and not before, methods were selected to obtain the needed data; and at this point, it was determined what kinds of samples should be selected for the study.

Without going into detail here, suffice it to say that the research design as developed required that the sample studied encompass people who had never obtained chest x-rays as well as people who had obtained x-rays voluntarily and under certain other conditions such as in response to social pressures, fears related to health, compulsion, and so forth. The design, in addition, necessitated that the samples be representative of various socioeconomic groupings within the population from which they were to be drawn. For these reasons and in view of certain other considerations it was decided to select three specific large cities for study and to draw representative samples in each totaling about 1,200 persons. Data were collected in this case through the use of a personal but standardized questionnaire consisting of about 90 principal questions. Several types of questions were used—all were free-answer and included direct as well as indirect and other projective questions. The hour-long interviews were recorded by trained interviewers as nearly verbatim as possible.

It is of particular importance to point out a few pitfalls in the use of questionnaires and interviews because administrative research in public health practice so often involves obtaining information from people and because this is not as simple as it may seem. We all tend to regard ourselves as experts in eliciting information from people, probably because we spend so much of our time talking to people. Frequently, however, we obtain less real information than we think. The fact is that obtaining personal and reliable information from people is more than an art. It also involves the use of scientific technics. Recently, a survey was undertaken by a state health department to identify health needs in a locality. One of the questions asked of a representative sample of community residents was: "What are the leading public health problems in this community?" This question might seem to a public health group to be relatively simple. But in order for a layman to give a meaningful answer to the question, he must know the meaning of these terms: leading, public health, problem, and this community. To the extent that any of these words are not understood, they will limit the kinds of answers that are obtained. Even more seriously, the words may be understood by laymen, but understood differently than the public health administrator understands them and the answers will thus be misleading. In the particular case described, approximately two-thirds of all the respondents could not report any leading public health problems in their communities.

This suggests that they did not adequately understand the question.

It was indicated earlier that Hochbaum, in attempting to tap people's beliefs about whether one could be sick without any symptoms, asked one straightforward, direct question but also asked some indirect or projective questions. Let us contrast the results. In response to direct questions, over 80 per cent of a group of 931 respondents stated correctly that x-rays could detect the presence of tuberculosis in a person before he would be aware of any symptoms. It would thus seem that most people understand that one can have tuberculosis without symptoms.

For the indirect or projective question, a drawing of a mobile x-ray unit was shown to each respondent. The drawing showed a few people standing in line to get x-rayed and it showed several who were apparently passing by. Respondents were asked, among other things, "Why do you think some of these people are passing by?" A good many of the respondents who had indicated that x-rays could detect tuberculosis before symptoms became noticeable gave such typical answers as: "They seem healthy—there'd be no need for them"; or "He probably feels O.K. It would be a waste of time"; or "They all seem to be healthy and strong—I don't know about this one—but the others. They don't look like they have tuberculosis"; or "Some may just be afraid to find out, but some don't need them, I guess. At least, they don't look like it." Despite the fact that these people had given the correct answer to the direct question, their responses to the projective question revealed ambiguity or real conflict about the issue.

While indirect or projective questions are extremely useful for obtaining information that people will not voluntarily provide about themselves, it should not be thought that their use is limited to this situation. Frequently a person himself does not know how he feels or is not sure. Questioning him, for example, about how others might feel about things will frequently elicit answers that are applicable to the individual himself.

In summary, obtaining valid information from people is not less complicated than say, sampling. Thus, expert consultation in questionnaire construction will be as beneficial as expert consultation in sampling.

A brief consideration of the logic of sampling will be sufficient for present purposes. The purpose of sampling is to reduce the amount of work involved in describing characteristics of some population group; and, since in public health work it is rarely feasible to study every member of the population with which we may be concerned, sampling is necessary. Now a finding obtained from a sample may be generalized to a population only when the individuals studied constitute a random or representative sample of the population. Briefly, the requirements for random (or representative) sampling are, first, that every member of the population or group to be studied has an equal probability of being drawn in the sample, and second, that each member drawn in the sample actually be studied or in some way accounted for.

A famous example illustrates how nonrandom sampling can throw off results with disastrous effect. In 1936, "The Literary Digest," a well known periodical, attempted to forecast the outcome of the presidential election through a scientific opinion poll. For the sample, a number of names were drawn from telephone directories. In 1936, the population of telephone subscribers did not represent the total voting population. Telephone subscribers were generally better off financially, and were more likely to be Republicans. In short, the first criterion of random sampling had to be violated in any tele-

phone sample in 1936 since many members of the voting public had no opportunity to be selected by this method. What happened? "The Literary Digest" predicted an overwhelming victory for Governor Landon, and subsequently went out of business.

A frequent question raised concerns the determination of minimum sample size needed. Briefly, one estimates needed sample size in terms of such considerations as the complexity of the analyses to be made, the heterogeneity of the population regarding the characteristics to be studied, the degree of precision of findings required, and the kinds of statistical measures to be used.

Obviously, methods for selecting random samples as well as for determining sample size are highly technical—so much so that even the experienced researcher will frequently call for the assistance of an expert in this area.

6. Planning the Analysis

It may be expected that with the development of a questionnaire the case-finding study would have been ready to go into the field, but it was not. It was known that time would be saved in the long run and serious errors avoided if a few additional steps were undertaken before the field phase. One of these steps involved an attempt to plan the kind of analysis that the principal investigator intended to make later with the data he expected to obtain. The mere step of setting up blank or dummy tables that show which data to be obtained will have to be related to what others and in what manner, occasionally will show gaps in the data that are being sought and may occasionally show that more data are being sought than are actually needed. Moreover, indicating the kinds of statistical procedures one intends to employ in the analysis helps to determine the minimum sample size needed. Finally, the analysis plans frequently show that the form in which the data are to be obtained will not render them susceptible to the specific kind of an analysis being designed.

As part of the analysis planning phase, it is important to make explicit plans for coding and content analysis of responses, if content analysis is to be applied. Since the purpose of content analysis is to extract information from obtained responses that is relevant to the variables being studied, the basic design of any coding scheme is properly a part of the research design phase and, therefore, should not be postponed until after the data are collected. As indicated earlier, the questionnaire used in the tuberculosis case-finding study consisted of 90 questions of the free-answer type. Thus, vast quantities of material were expected from the 1,200 or so individuals included in the sample. Moreover, since it is known that people may express the same thoughts or feelings in different ways, it becomes necessary to plan for extracting the essential points from the great variety of responses. A complex scheme for content analysis therefore had to be developed. To give the reader an idea of the details involved, it is necessary only to indicate that the coding scheme itself required 70 pages for presentation.

7. Pretesting Study Design

Normally, in the development of a project, one would at this point pretest his instruments on a small but representative sample of the population with which he is concerned. Unfortunately, as is so often true, in the case of the present example, inadequate time was available for thorough pretesting although some was done. And there was reason to regret the inadequate pretesting, for a simple clerical error in the instructions to the interviewer later resulted in the failure to obtain certain important information from about 150 respondents. More careful pretesting

would have identified this clerical error early and it would have been possible to rectify it.

8. Collection of Data

After all these steps had been accomplished, the study was taken into the field, the interviewers were trained intensively, and the data were collected. In all, approximately seven months had been required for the detailed planning of the study and three weeks were required to collect all the data. Thus approximately 90 per cent of the time spent on the study before analysis was devoted to planning. The ratio of time devoted to planning and of time devoted to collection of data reflects the great amount of care and effort that should be invested in the planning phase. The more care one takes to foresee potential difficulties and problems in the collection, analysis, and final interpretation of data, the smaller will be the risk of subsequent errors, omissions, and problems. Once the actual phase of data collection has begun, it may be too late to overcome such problems. In our experience more research projects fail completely or at least yield doubtful and distorted findings because of inadequate planning than because of inadequate methodology in the collection of data.

9. Analysis of Data

The complex content analysis that had been developed was applied to the collected data, and the latter were summarized through machine tabulation in the manner that had been prescribed by previous planning and which was necessary for the subsequent statistical analysis.

10. Interpretation and Reporting

In a study whose hypotheses have been stated clearly, the interpretation of data is always simpler than in one whose hypotheses are vaguely stated or not stated at all. In the latter case, one is required to rationalize the data after the fact, a process always fraught with some danger. As indicated, the study discussed here had a number of fairly well defined hypotheses with questions specifically designed to gather data relevant to the hypotheses. As a consequence, the interpretations of data were almost automatic in most cases.

It was recognized that the major impact of the study would be in terms of its usefulness to health workers everywhere. Researchers in public health practices have the obligation to seek publication for their material so that others may profit from both their successes and failures. In the present case, the methods and findings obtained were published as a monograph of the Public Health Service which was widely distributed to health organizations.

Principles of Research Design

The principles of research design that have been illustrated in the detailed example can now be stated.

1. A clear-cut unequivocal definition of the research problem and its relation to the purposes of the program is essential before good research can be undertaken. In our example, asking why people take an action led to a profoundly different study design than might have been implied by the alternate question: Why do people not take a particular action?

2. Review of the relevant literature is always important. Occasionally the investigator may learn that the very problem to be studied has already been solved by someone else or that certain helpful information has been obtained previously. Or review may suggest ways of improving one's own design by learning from the experiences, errors, and findings of others.

3. The hypotheses, questions, or hunches to be studied should be stated

explicitly and operationally to assure that their truth or falsity can in fact be established by the data. Moreover, key concepts in the research must be defined clearly to leave no doubt as to what they mean and to assure correct interpretation of the data obtained later.

Much research is carried out which does not proceed from formal hypotheses. Rather, data which are deemed relevant to the problem on hand are collected first. Their analysis and examination then leads to the formulation of hypotheses. This sequence of steps is proper and even advisable under certain conditions, notably when research is carried out on problems about which too little is known as yet to state formal hypotheses or when the primary purpose of the project is to generate new ideas and hunches.

However, contrary to what one might suppose, this approach is often more difficult and far more risky than one based on formalized if broad hypotheses. Unless the investigator is well trained and well versed in research, the returns are likely to be of questionable validity and not at all in proportion to the necessary investment in time, money, and effort. All health workers are acquainted with "research projects" in which vast amounts of resources have been poured into the collection of "facts" in the absence of explicit hypotheses. Too often the result has been little more than a collection of fairly voluminous but useless data.

Another point should be made. In most cases, an absence of hypotheses in research is more apparent than real. Though the investigator may not state formal and expert hypotheses, the mere fact that he decides to collect certain data and to disregard certain others shows that he has in mind some ideas, albeit vague and implicit ones, about the relationships of these data to the problem being studied. In short, very often the difference between formal and hypotheses-based design and what appears to be pure empirical research lies in the degree to which the ideas and hunches of the investigator have been thought through clearly and intelligently, have been made explicit, and are examined in a controlled and scientific manner.

Furthermore, the alleged absence of different data to permit the formulation of hypotheses is not infrequently used as an alibi for an unwillingness to think through a problem, to commit one's ideas to the scrutiny of others, and to risk refutation by subsequently obtained data. For all these reasons, we strongly advocate the use of explicit hypotheses in public health research unless there are strong counterindications.

4. Each hypothesis to be studied must be analyzed into its component parts in order to identify the specific data that will be needed to test it.

5. Too often a research technic is used merely because it is the easiest, or because it has worked in the past on a similar problem, or merely because it is available. When selecting specific research methods to be used, or when developing new ones, the following should be kept in mind: it is a dictum of good research to select the methods and technics in accordance with the hypotheses to be tested, the data to be collected, and the purpose to be served by the project. To the fullest possible extent the selection of methods, technics, and instruments should be based on this dictum, even though limitations in financial and other resources or in technical skills frequently restrict the investigator's free choice of methods and technics. Moreover, research methods, including the interview, are technical matters and should be developed and used by trained people.

The population to be studied should be identified as clearly as possible, and

when total coverage is not feasible, efforts should be made to observe scientific sampling procedures. Provision should be made for control groups where it is important to hold constant some factor not under study. The purpose of control in research is simply to assure that any observed findings are due to a factor that is being studied and are not due to some accidental, unique, or extraneous factor. When, for example, we wished to study the relationship between certain beliefs about tuberculosis and the voluntary decision to obtain an x-ray, it was not enough merely to show that the two were related. It is entirely possible, and in fact was true, that age and education are also related to obtaining x-rays. In order to test whether an obtained relationship between beliefs and behavior was not due merely to the effects of either age or education, it was necessary to apply statistical controls which ruled out influences exerted by important factors which we did not wish to study at that time.

6. The kind of analysis proposed should be specified during the planning phase and related to the kinds of data anticipated. This step often suggests improvements in the design before it is too late to make changes.

7. Adequate pretesting of materials should be undertaken before the study goes into the field to assure that questions are understood and that they provide the kinds of data needed.

8. The collection of data is frequently the briefest single phase of a research investigation. If the study has been well conceived and adequately pretested and if, furthermore, interviewers are well trained, relatively little difficulty will occur in the data collection phase.

9. Analysis and interpretation of data —In administrative research in public health, we may frequently deal in previously uncharted areas, seeking information that has rarely been sought in precisely the same way. This fact implies that the public health researcher will have occasion to use open-ended or free-answer questions with the people he studies. It follows then that content analysis will often have to be applied to data obtained in administrative research in public health. As indicated earlier, content analysis is a highly complex matter entailing the services of a technical expert.

In public health research, it is often advisable to sample large groups of people. When this is the case, research data will most efficiently be handled by machine tabulation—again an area where expert advice is essential.

10. In general, the interpretation of results is reasonably straightforward in definitive studies in which hypotheses have been operationally stated. However, in new research areas hypotheses may not be capable of fully operational statement. In such cases, ingenuity tempered by an appreciation of statistical theory will need to be exercised in attempting to infer the principles which most efficiently account for a set of results.

One of the most important obligations of the research specialist is to communicate his methods and findings to his colleagues so that their research efforts may be built upon his. In the area of administrative research in public health this obligation is even more pressing, since soundly conceived research should produce findings that can be applied to the improvement of public health programs even in localities outside the one that has been studied.

Prevalent Misconceptions About Administrative Research

It is widely but incorrectly believed that a research design will be judged favorably if it contains certain "magic" words, phrases, or concepts. The foregoing presentation should demonstrate

that the magic required is not one of words, but one of rational, systematic planning. The person who can develop a sound plan will rarely have trouble communicating its soundness, and conversely the person who has difficulty in communicating a good plan probably does not have one.

A second misconception is that inadequate research plans can be made acceptable by labeling them "exploratory." True enough, research in uncharted areas often involves exploration of imperfectly defined hypotheses or incompletely developed methods. But, as indicated in this paper, the exploratory researcher is not freed from the obligation to observe the principles of sound research design to the maximum extent possible.

A third misconception is that basic research in which research is an end in itself is good, and that applied research in which research is a means to an end is poor. Nothing could be farther from the truth. It is both possible and imperative to develop sound research designs in applied research, and it is not unusual to see poor designs for basic research.

Conclusions

The major purpose of this paper was to shed a little light on the nature of the research process and on some of its complexities. The design of research is a technical matter involving technical skills. The enthusiastic but untrained researcher is not more likely to discover new facts systematically than is an enthusiastic but untrained layman likely to perform successful appendectomies. In any attempt to do more or less definitive research, the skills of the trained researcher are essential. It may be added parenthetically that this restriction does not apply to all data-gathering activities of health agencies but only to those whose aim is to discover or establish new facts in a way that is generalizable to other situations and free of certain biases.

A second purpose of this paper has been to communicate the logic for allowing a relatively long planning period in the development of any research. The human mind is, for the most part, simply incapable of foreseeing all contingencies at one moment in time. By employing a process of successive approximation through trial and error, we can always improve our thinking. Thus, continual review of plans is nearly always required.

Finally, it should be clear that not all problems are susceptible to research under the conditions in which they would have to be studied. Much disappointment, time, and money can be saved by subjecting research ideas and plans to careful scrutiny for over-all adequacy. The application of the principles described to any research plan will invariably lead to suggestions that can materially improve the final research product.

It is self-evident that no brief article can cover all principles of research design. Indeed, it would be presumptuous to claim even that all the most important ones were considered here or that the ones selected were discussed with anything approaching thoroughness. Interested readers will find any of the sources listed in the bibliography —particularly those marked with an asterisk—useful for the planning and design as well as for the execution of research.

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A Decade of Milk Certification

Growing acceptance of the Cooperative State-Public Health Service Program for the Certification of Interstate Milk Shippers, now in its tenth year, is evidenced in a recent report from the Milk and Food Program of the Service. At present, 36 states and approximately 700 shippers participate in the voluntary program. In 1951, approved shippers numbered 160 in 17 states. Many states and municipalities use the program to obtain reliable information on the sanitary quality of milk supplies from points beyond routine supervision.

The Public Health Service has certified 115 sanitarians now employed in state departments of health or agriculture as milk sanitation rating officers. Milk sanitation ratings of pasteurization plants and their producing farms are submitted to the Service for listing in its quarterly publication, "Sanitation Compliance Ratings of Interstate Milk Shippers." The level of compliance ratings has risen substantially over the years with significant improvements in the sanitary quality of milk shipped under the program. Uniform criteria are provided by the "Milk Ordinance and Code Recommended by the Public Health Service."

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Journal of Public Health

EDITORIALS

An Exercise in Retrospective Epidemiology—And Its Possible Utility

Just about a decade ago Doll and Hill[1] reported a remarkable study which pointed to smoking as an important cause of lung cancer. Since then an association between cigarette smoking and the occurrence of lung cancer has been generally accepted, even though there still are investigators who minimize the significance of this association. A wide variety of investigations have been carried out to determine the causal factors that might be involved, either directly or indirectly, but few, if any, clear-cut results have been achieved. A recent review of the evidence by Davies[2] leaves one with the impression that the smoking-cancer problem is at present a tangle of controversy and possibility without any apparent prospect of early solution. For example, he points to the need for study of air pollutants and other factors that "may be essential features operating as adjuncts with smoking. . . ." From this viewpoint a recent paper by Satterlee[3] is of interest.

In 1956, Satterlee presented the thesis that arsenic in cigarette smoke can act as an important pulmonary carcinogen.[4] The current paper emphasizes the role of "arsenic as a potential carcinogenic, or cocarcinogenic, agent pervading the modern human environment." In support of the argument Satterlee cites an epidemic of arsenic poisoning that occurred among beer drinkers in the Manchester-Salford-Liverpool area of England in the fall of 1900.[5] The story is indeed an exercise in epidemiology and might well be studied by students of public health.

On November 9, 1900, a poor law physician of Salford reported to the local medical officer of health that he had in his district a large number of patients with peripheral neuritis who were only moderate beer drinkers. Further inquiry showed that most of the employees at a local brewery had suffered with similar symptoms for some three months. As the patients had no lead line on the gums and colic was absent, lead poisoning was not considered likely. The diagnostic puzzle was solved by Dr. E. S. Reynolds, the visiting medical officer to the Manchester Workhouse Infirmary, where in two wards containing 62 beds, there were 25 cases of "alcoholic neuritis." Reminded by his resident physician that a number of these patients had shingles, Reynolds jumped to the conclusion, "Why, there must be arsenic in the beer the people are drinking! . . . because, of all known drugs arsenic is the only drug which causes shingles." Obtaining some of the beer his patients had been drinking, he soon demonstrated arsenic in the sample.

Further investigation, first at Manchester, and in 1901 by a Royal Commission on Arsenical Poisoning, led to the discovery that arsenical contamination was present in the glucose used in the breweries of Salford, and eventually to studies of chronic arsenical poisoning. This work was accentuated in January, 1902, with the occurrence of another epidemic of arsenic-beer poisoning in Halifax, Nova Scotia. The Halifax outbreak, which comprised about 40 cases with two deaths, was not caused by glucose contaminated by arsenic, but by the use at one brewery, of a variety of gasworks coke high in arsenic content as a malting fuel.

The investigation of the Royal Commission on Arsenical Poisoning called attention to "volatile arsenic" in coals and in coal derivatives. The role of this arsenic became a matter of dispute and made no lasting impression on workers with cancer. Satterlee now emphasizes "the critical, oligodynamic effect of arsenic as a cocarcinogen in cigarette-tar cancer as contrasted with its toxic and tumor-inhibitive effect in higher dosage." He stresses "the epidemiologic significance of a labile-arsenic component of fossil fuels being discharged into the atmosphere by flame combustion and thus risking conjugation with polycyclic hydrocarbons, cresols and phenols during pyrolysis." Whether or not one accepts this thesis, one point made by the author must carry weight. "It is depressing," he says, "to contemplate present-day inertia in the smoking cancer problem, frustrated in a tangle of controversy and mixed motivation, without prospect of the authoritative organization and coordination of action that its solution demands."

The fact of the matter is that Satterlee's point is only too well taken. Too many workers in this field have taken positions and are more concerned with their defense than with their possible abandonment. The fact is that while evidence in favor of a relationship between smoking and epidermoid lung cancer appears to be consistent, confirmation of such a relationship in terms of pathogenesis is still absent. The very nature of this situation requires that all possibilities be investigated in a coordinated manner, even those that seem to be contrary to accepted doctrines.

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The Vocabulary of Health

A WORD is a word is a word, to paraphrase Gertrude Stein. But what is a word? It is neither concrete reality nor has it substance. Yet the combinations of sound that we call words are intimately related to human thought and behavior. Words have emotional associations, musical and poetic values, and can also convey meaning. Even more important is the fact that in combination these qualities and attributes come to symbolize the things that men desire, no matter how illusory these may be. A life, a society, an entire culture may fall prey to such deceptive symbols and be lured into futile pursuit of a mirage symbolized by a word.

It is indeed true that words help us to communicate and to organize our behavior with purpose and meaning. But it is also true that there is a ten-

dency for words to imprison the mind and to corrupt thought. Words can be devalued, degraded, and corrupted; and such words debase and confuse thought and action. To see how this process works one need only examine the vocabulary of health, past and present.

One may see how a good word, sanitation, has become flecked by association with dirt. Similarly, with an assist from the pitch men of the commercial world, the lovely goddess Hygeia, has been endowed with the flavor of toothpaste and the texture of cellulose. But we do not really need this help. Our colleagues are independently capable of degrading good words and of manufacturing poor ones. As a result, one may observe such current verbal terata as the "aging"; the "sewer-connected population"; "radiological health"; and "problem"—used as a universal noun, like "thing."

A few confections of this kind need not occasion alarm. As language changes in response to new needs and conditions, words will be coined. Some will be imprecise, awkward, improperly employed, or open to distortion. Eventually some words are dropped, others are restricted in use, and still other new ones are invented. This is the process by which language grows, but the process is not completely spontaneous; in part, at least, it can be controlled. But the control is vested in events as much as in the word-smith. Several examples will serve to make the point.

The "aging" as a noun is a term that is said to cause the flesh to creep. No one likes to be reminded that time dribbles on. And rhetoricians cringe at the spectacle of a gerund masquerading as a noun. "Senior citizens," a confection of the National Education Association, is even less popular. To some it suggests a beer-hall campus loaded with gaffers. The problem here is to confer a sense of dignity and humanity on the remnants of a cohort widely considered to be a simple nuisance if not a burden to their juniors. The term, "elder," was forced by a zealous editor upon one contributor to the literature, but he was not happy with it. The solution may be to cease to segregate any category of citizens. Let there be no rank discrimination on grounds of race, creed, sex, or age. Given adequate medical and social services for all, aging may then cease to be a categorical disease, or a term of opprobrium.

Delegates to the conference on homemakers in Chicago in February, 1959, worried over such an issue. "Homemaker" carried unhappy connotations, implying to clients that they were not competent to manage their own affairs, and implying to the social servants certain duties or limitations which were objectionable. But what alternatives were offered: "home aids, home helps, home keepers, family aide, household aid, steward, housekeeping service." Only limits of imagination inhibited such suggestions as "Samaritan, neighbor, or angel." Miss Brahna Trager sensibly voiced a common understanding that words develop their own connotations in use, that the term itself is less important than the activity. Nevertheless, with rumblings of Madison Avenue in the room, the notion persisted that the homemaker service needs a good five cent label.

"Radiological health" is a term comparable to a label like "tuberculous health." And yet its inventors were reluctant to separate the benefit from the hazard. Although "radiation control" would at least be consistent with "pollution control," in the anarchistic mood of recent years even the word "control" has had sinister connotations. Perhaps the enterprise which has given birth to such wonderfully descriptive terms as "fallout, rabbit, hot, and shield" will yet come up with a pungent description of the job of protecting society from the

consequences of its monkey curiosity. Let us hope, at least, that there will always be a "radman."

The words "problem" and "program" are so overworked that sometimes editors will play Beaver with them as they read copy to each other. The first to spot "problem" scores two points; "program" scores one, being on the whole more likely to have a legitimate use. "Problem," on the other hand, can almost always be replaced by some more hopeful term, such as "need, prospect, outlook, condition, arrangement, or challenge." Too often it betrays the author's own frustration or despair rather than a real arrangement of questions to which he seeks the right answers.

The major abuse of the term "program" occurs when there is none. An author may have an idea, or even a plan, or there may be a schedule of activity, and even a high degree of random activity, but all this may be described as a "program" only by a special act of grace. To correct the abuse of "problem," a slight psychological adjustment may serve; and "program" may be restored to respectability if its users will look themselves squarely in a mirror.

Venturing an assault direct upon the holy of holies itself, Dr. I. Gordon, medical officer of health of Ilford, England, has issued a polemic titled "That Damned World Health." In his judgment, members of the health services are doomed to poverty until they learn to identify themselves as disease fighters. He takes no stock in positive psychology when it comes to dealing with budget officers and others with fingers on the public purse. Here we have dissatisfaction not simply with the shape or connotations of a word but with an entire concept and philosophy. The moral and ethical questions raised by this challenge are formidable. For example, is it not a betrayal of mental health to put all one's emphasis on a negative approach? On the other hand, may it be a betrayal of holistic health to pursue a rigid policy that so far has kept health services on a semistarvation diet? From the arena of this conflict, the discreet will silently withdraw.

We simply suggest that in the vast constellation of professional skills which attend the public health, there may yet be need for further consideration of the proper use of the English language. Like radiation, words can be dangerous or useful, or both. The degree or quality of thought may swing the issue, but hardly in the face of a hostile history.

The Journal is indebted to Marcus Rosenblum, editor, Public Health Reports, Washington, D. C., for the above editorial.

Basic Research in Social Sciences

The National Science Foundation announced in December that it was elevating the status of its Office of Social Sciences to that of Division of Social Sciences. In taking this step the Foundation is stressing the need for supporting fundamental research in the social sciences in the face of a growing emphasis on the promotion of applied research in this field.

The new division will organize its support of basic social science research under four programs: anthropological, economic and sociological sciences, and the history and philosophy of science. Dr. Henry W. Riecken, formerly head of NSF's Office of Social Sciences and professor of sociology at the University of Minnesota, has been appointed assistant director of the new division.

REPORT OF THE CHAIRMAN OF THE EXECUTIVE BOARD OF THE AMERICAN PUBLIC HEALTH ASSOCIATION TO THE GOVERNING COUNCIL 1959-1960

Committee Leadership and Structure

There are many ways in which the value of a professional association like ours in a free society might be measured. However, there is probably no single indicator of that strength more valid than the individual dedication, inspiration, and competence of the leadership of our various committees and work parties. Selection of that leadership is one of the heaviest responsibilities laid on the Executive Board by our Constitution and By-Laws. Surely it is no secret that there has been dissatisfaction from time to time over the designation of committee chairmen and membership by our Board. But I suspect that there has been more dissatisfaction on the Board itself than anywhere else!

This has certainly not arisen through any lack of the highest caliber professional leadership from our designees; but, rather, a feeling that in so vast a country, so varied a profession with such a multiplicity of skills and competences, it was well nigh impossible for any group to know all the possible candidates well enough to choose wisely and repeatedly among them. Two years ago we started a systematic canvassing of our membership through the Committee on Committees made up of the secretaries of all 14 Sections. These people, along with the previous committee chairmen, probably have a wider geographic and intradisciplinary acquaintanceship among potential leaders than could any other similar group of people in the nation. That first year a total of 52 individuals suggested by the Committee on Committees was appointed by the Executive Board within 108 positions. In other words, about 50 per cent of the replacements or reappointments came from this broader based source. With that in mind, the Board utilized this device at our first meeting following the last session of the Governing Council in 1959 to select again about 50 per cent of our committee members and chairmen from this source. We believe that the productiveness of the committees and the new faces which have been introduced to our committee membership in this fashion have made continuation of this experiment worth while in 1960. However, because of considerable criticism of the name "Committee on Committees" we are now calling it "Committee on Membership Deployment"—which probably will be criticized with equal violence. If any of you have the ideal name for such a unit of the Association, please do not hesitate to let us know.

New units authorized by the Executive Board during the year to which members were appointed include a new Program Area Committee on Health Services in Disaster, a Committee on International Health, and an Advisory Committee on Finances, the first two having served on an ad hoc basis during 1959.

Agency and Sustaining Memberships

Following the recommendations of the Arden House Report, the Governing

Council in 1957 approved and adopted changes in our Constitution and By-Laws making possible a new type of membership for certain health agencies. This provision was due in part to the acknowledged need of a sound basis for expanded income if the Association were to expand its services to members; but it was also an equally sincere recognition of the present "facts of life" in public health practice. For the individual can accomplish little except through the group, and benefits from a professional association like ours do not stop with the individual but also have significant values for the organized groups making up our health agencies. It was deemed wise to utilize the major foundation grants which had been made for the purpose of expanding Association services to establish our Washington Office, our Western Regional Office, to add staff and services in the field of professional education, and to add further administrative consultation competence in the central office. This having been done during the following year, we were prepared to offer Agency Membership on this expanded base during 1960. It gives me a great deal of pleasure to report that more than 25 per cent of our state departments of health have signified during the year just passed their intention of taking out Agency Membership and that 11 have already secured funds and made their payment of Agency fees for the current year. In those states where approval of the plan has been indicated by official agency participation, Agency Memberships have been offered to the local departments of health, and in the one state where staff time has been available for intensive follow-up of evidences of interest the response has been very encouraging. The next step will be to offer Agency Membership to those interested nonofficial agencies who desire in this fashion to benefit by membership in the Association and to support our efforts. You may be interested in the list of states that have already completed application and have been or are about to be elected to Agency Membership by the Executive Board:

California	New Jersey
Colorado	North Carolina
Florida	Ohio
Idaho	Oklahoma
Maine	Pennsylvania
Maryland	Washington
Montana	Wisconsin

The Board also has acted favorably on an Agency Membership for one of the Graduate Schools of Public Health, that of the University of California. The first local health department to be elected to Agency Membership was the San Joaquin Local Health District of California.

This is a good beginning but much more must be done and much more of this type of support must be secured if we are to have the firm financial base for operation at our present expanded level which will be needed at the termination of our foundation grants.

With regard to Sustaining Memberships, it would seem that the various health-related industries of the nation have an ever-growing equity in the kind of joint professional planning and standard-setting represented by an organization such as the American Public Health Association. With its tradition of bringing together all levels of official health agencies in government, other professional organizations, the voluntary health agency leadership, and those health workers who are employed by industry —with this tradition our Association offers an unparalleled opportunity for all segments of the complex health field to participate in activities which help to shape tomorrow's public health practice.

In the light of these considerations the fact that our Sustaining Memberships from industry represent something less than 1 per cent of our total income

would seem far out of proportion to the contribution we make in this joint effort.

Planning Methods of Procuring Additional Funds

It has already been mentioned that the Board established an ad hoc Advisory Committee on Finance to assist in planning for additional support for the Association. A number of outstanding persons in the field of finance and industry have agreed to serve on this committee which is still in the process of formation.

It is hoped that through this mechanism we will be able to "lay our case" before American industry and secure substantially more support than the mere token amount currently available. An increase in the number of Sustaining Members is one way in which this can be achieved.

It was also agreed by the Board during the year after a number of discussions that in the future our appeals to foundations should be on the basis of specific projects of a demonstrational or service type rather than for unearmarked general support funds. A number of such projects are drafted or in the process of being drafted and will be referred to later on.

1960 Budget

During 1959 our expenses for the first time approximated one million dollars. Fortunately our income was in balance. The budget approved by the Executive Board for the year 1960 amounted to $1,058,450, and in view of the anticipated cessation of one of our major foundation grants and the expectation that Agency Membership and Sustaining Membership income would not offset that deficiency, approval was granted for the utilization of $27,250 from reserves to balance the budget. It is too early to say for sure whether this utilization of reserves will be actually needed, but unless additional Agency Membership support is secured in the closing months of the year it undoubtedly will be.

The form of the budget as presented this year follows closely the statement of income and expense which appeared in the March issue of the Journal for the fiscal year 1959. In that statement for the first time a breakdown was available of costs for salaries, expenses, equipment and supplies in each of our major activities. Also during the year a system of quarterly reports has been adopted rather than monthly summaries which will give the Board a continuing check on income and expenditure geared to the form of the budget now in use. The staff has been asked by the Board to present a narrative justification with its 1961 budget which would include desirable plans for new projects which might be carried out if additional funds were available. It is the considered opinion of the Board that there is an urgent need for a minimum of $200,000 from Agency Memberships in 1961—approximately half of this to preserve the advances made in the last three years and the other half to make further advances in services to public health.

Plans for the Future

Some of these additional Association activities which could be carried out if more funds are secured might include support for regional offices serving the Southern Branch and the Middle States Branch; employment of a research consultant for project design; and employment of a public relations counselor. These suggestions are a few among many that have been considered by the Board in terms of additions to our general services. They would supplement and not conflict with specific projects of narrower interest which might be

supported through foundation or federal grants.

One of these special projects deserves particular mention. It is the proposed joint effort with the National Health Council to establish a commission on community health services. For several years there has been a growing conviction on the part of Association members and particularly the leadership of its Program Area Committee on Public Health Administration that there is a vital need for a revision of the recommendations and philosophy expressed in the Emerson Report which was titled "Local Health Units for the Nation." This committee report of the APHA was published in 1945 and served as a very effective stimulus to development of more and better local health departments for the first decade or so after its publication. Still with the conviction that local health units are the optimum mechanism for providing community health services of most types and in most areas, it must be admitted that the picture of public health services has changed during the intervening years. There has been an expansion of both the need and demand for certain types of new services and a diminution in both need and demand for other types of traditional public health services. To meet this changing situation an intensive and extensive examination in depth of community health needs and the part which organized public health can play in meeting them is urgently needed. With the National Health Council providing coordination between many related health agencies and with the American Public Health Association providing the professional guidance for this reevaluation of community needs and services, it should be one of our high priority special projects providing funds can be secured. This would probably entail at least three years of active data collection and analysis, including a national conference to pull together recommendations based on those findings and followed by a year or two of follow-up work to assure acceptance of the recommendations.

Other Actions of the Board

After two years of study a personal classification and salary plan drafted by the Association's own consultant in this field was submitted to the Board, reviewed and approved. It provides for an orderly allocation to position grades according to responsibilities and duties; a system of annual increments based on satisfactory work performance; and provisions for promotion to higher grades with increasing competence. Annual review of the plan by the Board is contemplated.

On the recommendation of the Committee on Affiliated Societies and Regional Branches the Board decided to remove former restrictions to distribution of our legislative news letter by Affiliated Societies. This has proved an extremely valuable and much appreciated addition to our publications and numerous requests for authority to duplicate and distribute it among a wider readership was acknowledged and is now possible.

A compilation of policy actions by the Governing Council on public health matters was drafted by the staff of the Public Policy and Legislation Committee early in the year. A number of revisions have been carried out with the advice of that committee. The Executive Board has reviewed several drafts, all of which exposed a number of significant lacks of established policy in currently important fields of public health practice. The most recent revision of this document was circulated by the Executive Board to the Governing Council for additional suggestions and to stimulate action by our component units in initiating resolutions or other policy statements to be con-

sidered by the Council to fill those gaps. The Executive Board hopes that we may eventually have a reasonably comprehensive statement of Association policies on all major areas of public health concern.

The past year saw a number of improvements in the mechanism of handling the selection of Lasker Award candidates by the Lasker Committee. Criteria were established both in the field of medical science and public health so that a more uniform system of comparison of candidates would be possible. On the recommendation of the chairman of the Lasker Awards Committee the Board approved the idea of soliciting Fellows of the Association for nominations prior to the Annual Meeting this year; the appointment of a full committee for the succeeding year at the time of the Annual Meeting; also a continuation of the practice established this year of dividing that committee into two major subcommittees, one for medical research and the other for public health research, in addition to subcommittees to explore certain newly developing fields for appropriate candidates for the awards. With the growing volume and complexity of research in the health field this additional assurance of continued high caliber of candidates for these top awards is, of course, most important.

Several steps have been taken in the direction of strengthening the activities of our 14 Sections. A meeting of the Section secretaries with the central office staff prior to the Program Committee meeting was again held this year. Also, designation of specific staff members to act in a liaison capacity with each Section was announced (see Staff Report in the March, 1960, Journal). For the first time the officers of the Sections have been invited to meet with the Executive Board to discuss their problems and plans at the time of the Annual Meeting this year.

Summary

The year has been a busy one with major advances achieved in the field of health legislation and with major changes observed in the direction of new public health services in some fields and expansion of traditional ones in others. Reports of the Standing Committees, the Staff Report, and some of the items I have included here indicate to me, at least, that the American Public Health Association is moving ahead with the times and is contributing in no small measure to the improving competence of our individual and Agency Members to serve better the health of the nation.

JOHN D. PORTERFIELD, M.D.
Chairman

Dr. Porterfield is Deputy Surgeon General, Public Health Service, Department of Health, Education, and Welfare, Washington, D. C.

Report of the chairman of the Executive Board to the Governing Council at the Eighty-Eighth Annual Meeting in San Francisco, Calif., October 30, 1960.

REPORT OF THE CHAIRMAN OF THE TECHNICAL DEVELOPMENT BOARD TO THE GOVERNING COUNCIL 1959-1960

THE BOARD continues to endeavor to serve the Association as a regenerative unit in development of ideas and dynamic action. Even as the Board and the Program Area Committees hatch new activities, they continue to labor diligently in carrying to definitive completion the tasks already started.

Publications

The publications completed and in preparation are one of the most visible accomplishments of the Board and Program Area Committees and, perhaps, one of the more important, for they are a principal media for putting an accurate image of public health content, methods, means, and aspirations before our own members, our readers, members of allied professions, and to an extent before the general public. New volumes published or in preparation in a measure indicate the scope of public health and should extend the range of readers.

Publications in 1960

Chronic Disease and Rehabilitation: A Program Guide for State and Local Health Agencies

Guide to a Community Health Study (revised edition)

Services for Children with Heart Disease and Rheumatic Fever

Publications Planned in 1961

Administration of Community Health Services

Control Methods for Mental Disorders

Guide for the Medical and Public Health Nursing Supervision of Tuberculosis Cases and Contacts (revision)

Health Practice Indices (revised Evaluation Schedule)

Services for Children with Emotional Disturbances

Services for Children with Mental Retardation

Services for Children with Orthopedic Handicaps

The Role of Public Health Workers and Physicians in Accident Prevention

Broadened Spectrum

A report on "A Broadened Spectrum of Health and Morbidity," prepared by a Work Party under the chairmanship of Dr. Samuel M. Wishik, follows. It is a succinct summary of the deliberations of the Work Party and Technical Development Board discussions. Readers and each unit of the Association are urged to interpret and use it imaginatively as a real conceptual tool, for in this spirit it was developed. Comments about its content or use are sought by the Board. The report follows:

This troubled world cannot afford to be passive or merely reactive to each new problem. It must take the offensive with some universal or compatible ethics of human behavior and conduct. In a segment of the larger problem, public health cannot sit back and wait for the extermination of mankind. It must, despite the pessimisms of the moment, aim for the ultimate ideal of optimum health for all people.

Holding an ultimate goal does not preclude giving attention to the things that are needed now. Different parts of the world face different types and amounts of health problems. Each must, at the moment, attack first things first. But all must constantly bear in mind that the limitation of effort to the pro-

grams of highest priority is a limitation and should be temporary. In the meantime, what other efforts can be initiated? What lesser attention can be given simultaneously to other activities which carry a lower priority? Which of these other activities might help attain the more immediate and pressing goals, by relating to them and helping to round them out?

In oversimplified fashion, four levels of public health concern and effort can be delineated.

1. Mortality
2. Serious morbidity
3. Minor morbidity
4. Positive health

The levels are accretive; as a public health program moves progressively from Level 1 to Level 4, it adds new concerns and efforts, does not displace the previous ones.

Level 1—Mortality

The first essential of public health is to conserve life. In desperately underprivileged areas of the world, the meager public health resources may be overtaxed merely in fighting deadly plagues and famine.

Level 2—Serious Morbidity

In the United States and many other countries, public health has long ago gone far beyond mere concern with death-dealing diseases, but has sought to prevent, control, and treat diseases and conditions that disable, cripple, or produce chronic illness. The treatment of streptococcal diseases for prevention of rheumatic fever is an older example. Accident prevention and control programs are newer efforts. Unhappily, the prevention and management of even serious morbidity are still infeasible in some areas. The country struggling to save its babies from dying of kwashiorkor cannot stop or have the resources to be concerned about rehabilitating the child who had a leg bitten off by a shark.

Level 3—Minor Morbidity

Some countries are fortunate enough to have been able to keep pace with the development of new knowledge by its effective and wide application in public health programs and still have the potential to do more. If they have a social concern for meeting human needs at a less crude level than mortality and serious morbidity alone, it is practicable for them to look seriously at the matter of minor illnesses. Examples would be the common cold, digestive disturbances, and other minor infections that cause inconvenience and economic loss, environmental conditions such as smog and poor housing, and states of personal tension, annoyance, and impairment of social relations.

Level 4—Positive Health

Only when Level 3 has been met successfully could a people expect to be within reach of Level 4, positive health. Society's standards and expectations for all men must be such that public health, together with other social efforts, would naturally be concerned with helping all persons toward attaining a full sense of physical vigor and mental well-being and maintaining a constructive and wholesome relation with others in a safe and pleasant environment that promotes longevity and happiness.

We see the United States in 1960 as ready for Level 3 work. The present statement makes suggestions for public health workers to tackle Level 3 in terms of our present know-how, resources, and readiness. In addition, this statement makes some recapitulation of aspects of Level 2 that public health workers have been attacking and need to continue to fight in order to bring Level 3 within closer reach for more people.

Together, the two sets of recommendations aim to broaden the spectrum of morbidity, as defined by public health workers, in two different ways; one, horizontal or qualitative, and the other vertical or quantitative. The qualitative broadening would come from giving greater attention to what are now considered minor aspects of serious illness; the quantitative broadening from lowering the threshold of public health definition of morbidity to include minor conditions for which we heretofore had little time or inclination.

I. Qualitative broadening of the spectrum of morbidity (adding aspects to the current handling of morbidity)

A. Take a "24-hour look" when assessing the health problems and needs of an individual or group.

An occupational health program for factory workers cannot be oblivious of home and transit factors.

A school health program should give attention to the after-hours part-time jobs held by the pupils.

B. Take "a group look." The public health worker should look not only at the individual with presenting symptoms but also at the groups of which he is a member and from which he comes. The individual's group may be his family, his fellow workers, his neighborhood, his subethnic group, his community.

What types of respiratory or other illnesses are the members of the group having? What are their dietary patterns and eating habits?

What is expected of the worker by his group? What is the status consciousness in the group? What are the intensities of flow of positive and negative emotions among members of the group? What is the identification with the group—the feeling of group belonging or its absence—anomie?

C. Take "a bearing" on the individual's important goals, immediate and ultimate, such as education, vocation, marriage, parenthood.

In a program of rehabilitation for crippled children, the administrator will try to get a hearing aid for the deaf child as early as possible, because one of the child's most important goals and demands at this stage of life is education.

The tuberculosis control program may offer ambulatory treatment and vocational counseling to help the patient stay on the job or find a new one.

The three "looks" described above give additional meaning to "case finding." The usual definition of this term is identification of a person with a diagnosis that has not been recognized, that has not been referred to appropriate treatment agents or that is not receiving care. Is it not important that the definition of case finding be extended to include patients with a diagnosis, referred to a treatment agent and under care for the condition, but not receiving complete care in the sense of the broadened look at his needs?

The health worker concentrates his search for new cases of a disease where there is greatest likelihood of their occurrence. Similarly, after the patients have been placed under care, he should be able to characterize the different types of patient and types of service so that he can focus upon those with the most unmet needs and most incomplete management.

The three "looks" lend additional coloring to "epidemiologic study," especially in efforts to identify stressful environmental factors that may be associated with health impairment.

Geographic and social mobility is a conspicuous feature of American society, compared with other parts of the world. Transition is usually stressful. Special attention needs to be given to recognizing and measuring the needs of individuals or groups caught in the process of transition; and public health programs should be focused accordingly. Communities send out a "welcome wagon" to sell commercial products to the newcomer. Should not health departments send the "welcoming public health worker" to the newcomer in the community? Might the school health program identify more problems in the child who has just been transferred from another school?

Prolonged separation of the young child from his mother is believed to be psychologically traumatic. When the separation is unavoidable, what special steps should local health departments or other health workers take to try to minimize the traumatic effects?

Studies of stressful factors in the environment should bring public health workers closer to thinking about what is "healthful living," in terms of family, education, economy, job, etc. Studies of such questions cannot and should not be made by public health workers independently. They need to collaborate with other disciplines. Answers that are found would not lie in health measures alone, which public health workers could effect. Public health workers and others might point out needs for general social

action which would lead to better health, among other larger gains.

II. Quantitative broadening of the spectrum of morbidity (lowering the threshold of the definition of morbidity)

A. Minor illness.

Each season of the year, communities find themselves afflicted with outbreaks of minor health conditions, unnamed or called flu, intestinal grippe, virus "X," etc. The physicians find that the clinical syndromes are repeated with striking regularity in patient after patient. Why cannot a local health officer establish a "reconnaissance team" of a half-dozen busy private practitioners plus one or more outpatient clinics to report to him as soon as they begin to notice the repetition of a syndrome? At an early stage in the outbreak, the health officer could alert the rest of the health community to the minor illness that is rampant and to some of its apparent characteristics, such as infectiousness, age of predilection and incubation period, and impressions concerning its sensitivity to one or another particular medication. For example, an outbreak of German measles was characterized by symptoms of meningeal irritation, simulating meningitis. An outbreak of relatively mild sore throat was followed in an unusually high proportion of cases by severe kidney damage.

B. Minor impairment in health, performance, or comfort (fatigue, job absenteeism, pain, anxiety). Each type of health impairment by itself may seem quite minor. The combination of several effects may assume significant proportions. Only by keeping them in mind can further studies demonstrate their importance and suggest steps for their recognition, prevention, or elimination.

C. Individual differences. Within what we usually consider the normal range of characteristics and health attributes of people there are great individual differences. Individuals who find themselves nearer the extreme than the mean in one or another characteristic of their physique, health, or personality may encounter difficulties which affect them, their personalities, their adjustments, or their status. Because of their extreme difference, these individuals may be more vulnerable to stress and more susceptible to injury, in a number of ways.

1. Certain persons seem to have higher sensitivity or lower tolerance levels, such as to noise, heat, cold, ultraviolet light, and so forth.
2. Commercial and industrial design, such as in clothing, mechanical equipment, automobiles, etc., do not adjust to or make allowances for the sizable portion of the population who fall closer to the extremes of the normal range than the average. These individuals may not be able to manipulate or fit into their environment as easily as individuals who are closer to the mean.
3. Society establishes a stereotype of what is socially most desirable in any given personal characteristic, whether it is height or weight or otherwise. The stereotype may be at or near the mean, but often it is quite apart from the mean, such as the size of a woman's breasts. Individuals who deviate considerably from the social stereotype are disadvantaged in their social and vocational relationships.

The critical point at which an individual difference threatens to become detrimental varies with the characteristic in question, from group to group and in other ways. The critical points need to be identified so that selective attention can be given to the problem.

The public should be educated away from the stereotyped picture of "the normal." The atypical individuals should be helped. For example, adolescents need interpretation on the significance of very early or late pubescence. Professional workers should be made aware of the possible impact of individual differences and should be trained to handle them.

Sometimes, individual differences become clues to case finding of subclinical disease or to familial heterozygote carriers of certain inborn errors of metabolism (e.g., cystic fibrosis of the pancreas).

D. Remote time relationship between causative or contributory factors and their observable effects (e.g., radiation, air and water pollution, cigarettes, diet, food additives).

Obviously, much research is needed. A start should be made in the concurrent collection of types of data that will be needed ten or thirty years from now and that will be unobtainable retrospectively. One cannot crystal-gaze completely, but it should be somebody's responsibility in public health to begin formal collection of data as bench marks for future study (e.g., radioactivity levels of soil, plants, and body tissues; concentration of trace heavy metals in drinking water and food; air composition and noise levels in cities; some indexes of emotional tension in people's lives).

This statement has concentrated on "minor morbidity," or Level 3, of public health concern. Just as there is no sharp distinction between minor and major morbidity (Level 2), so programs for prevention and control of minor illnesses must in the other direction merge imperceptibly into efforts aimed at attaining "positive health" (Level 4). Our present task is that of "breaking the morbidity barrier." To the extent that we succeed in this, our future attention may then be given to the conservation and full utilization of human resources.

What Is the Role of the APHA?

The Association, through the Technical Development Board, has initiated discussion of these questions and should continue to look at them carefully and critically in national, regional, and local meetings; should publish thoughtful reactions; should collect examples of problems and of methods developed by public health workers to meet them; and should seek to collaborate with other organizations outside the field of public health toward the common basic ends of a better society and a better life.

Public Health Practice and Research

The Technical Development Board considered basic, and particularly the regenerative, aspects of public health practice and their relationship to research. It noted the current high degree of obsolescence of programs or products in public health, as well as in industry. The regenerative aspect is, therefore, increasingly important. The Board believes it has responsibility in this regard but directs the attention of the Program Area Committees and the Sections to it also. As in industry, the research industry per se, is steadily increasing and is a large competitive force itself, both to replace the old and to be competitively successful in new endeavors. The responsibility for initiation and for regeneration through research is an integral part of public health practice.

Consideration of the methods, climate, machinery, and concepts of the stimulation and support of research resulted in a draft statement of a possible approach which might also form the basis of a grant request. This and earlier exploration of a research program of the Association have formed a partial basis for the agenda of the Committee on Research Policy meetings and has created continuing ripples in other units of the Association. A part of the draft statement is as follows:

"There is a need for probing new organizational and planning technics for bringing research resources to bear most effectively on public health problems. This presumes an accounting and evaluation of research and service program objectives through imaginative projecting of ideas by mature members of the public health profession. It also presumes an investigation of costing and probabilities of research by the use and availability of various sources of new and existing manpower.

"Goals of a grant request are:

1. Guide and stimulate research in public health over the next decade.
2. Program-out possible research areas with concept of finding most likely profitable areas for various budget levels.
3. Develop technics for incorporating into health programs continuous measures of

goal-fulfillment which (a) keep the operation of the program in line with program goals and (b) signal the time to phase the program out of existence or into another program.

4. By this positive and forward approach in this professional society, stimulate similar approaches on the part of large (governmental) granting agencies."

Local Health Organization

An earlier proposal for reconsideration of the geographic and administrative basis for local public health organization has blossomed into an Association proposal to carry out this intent through an extensive special nation-wide investigation, national conference, and published document. The proposal has been developed through a series of meetings of a steering committee with representatives from our Program Area Committee on Public Health Administration, the National Health Council, National Advisory Committee on Local Health Departments, Public Health Service, American Medical Association, and American Hospital Association. Each revision has been reviewed and approved by the Executive Board. It embodies ambitious programs of technical and community fact finding supervised by a Commission on Community Health Services, supported by a sizable budget and carried on by a director and staff. Funds are being sought for its support.

Medical Care

Last year's statement of "Public Health Role in Medical Care" is being used as a basis for further critical analysis and collection of examples of health department activities which improve the quality of health or medical care, both with more usual health department activities as well as through assigned functions in administration of indigent medical care programs. (Possible Supplement.)

National Conferences

The Program Area Committee on Child Health aided in Association preparation for the White House Conference on Children and Youth. The Second National Conference on Evaluation (September 11-14) has been sponsored jointly with the University of Michigan School of Public Health and plans have been formulated for a National Conference on Environmental Health. The Program Area Committee on Chronic Disease and Rehabilitation is assisting in developing Association readiness for the 1961 White House Conference on Aging.

Criteria for Program Area Committees

The TDB has developed criteria for making recommendations to the Executive Board regarding desired program area committees, their establishment, continuance or discontinuance. These criteria will be applied for the first time this fall. (See the Supplement at the end of this report.)

Highlights of Program Area Committees

Accident Prevention

Continuation of activities related to the development of an accident prevention book.

Preparation of a pamphlet on wringer injuries.

Preparation of resolutions for next American Public Health Association meeting.

Preparation of a policy statement on Public Health Role in Accident Prevention.

Develop plans for a joint conference on academic prevention classification.

Convene a conference of representatives of casualty insurance companies.

Completed study to determine feasibility of setting up a research subcommittee.

Child Health

Standard-setting in its broadest sense:

a. Development of guides on health supervision of young children and on services for children with various physically handicapping conditions, including mental retardation.

b. Plans for the development of an authoritative statement on the place of tuberculin testing in the child health program.

Review of the broad field of health services for mothers and children, e.g., a joint project with the MCH Section and the Association of MCH and CC Directors to delineate the present scope of maternal and child health programs and outline future directions.

Technical representation of APHA in outside activities cutting across interests of several Sections, e.g., work in connection with the recent White House Conference on Children and Youth.

Exploration of poorly defined areas for future development:

a. Plan review of aspects of child health services which have a definable relationship to adult health in both positive and negative senses.
b. Possible review of public health aspects of genetics and genetic counseling.

Role in research. The specific research interests of the committee are those of general significance related to the community, organizational, and social aspects of child health care and with studies relating to the prompt and widespread application of results of research in clinical, physiological, and other scientific fields. In selected instances, the committee may be helpful in:

a. Defining the nature of maternal and child health problems and in indicating the need for research.
b. Suggesting approaches to the problem.
c. Suggesting appropriate investigative groups to conduct the research.
d. Promoting the research with these investigative groups.
e. Consulting on means for obtaining financial support and needed personnel.
f. Promoting wide dissemination and application of findings of important projects.

As a specific example of the committee's research role, it has agreed on the desirability of a series of intensive community "case studies" of maternal and child health services in different kinds of communities which might delineate effective patterns of services to serve as models of improved health services.

Chronic Disease and Rehabilitation

Receive comments and criticisms on the Chronic Disease and Rehabilitation Program Guide.

Establish a subcommittee and promote APHA activity in the field of alcoholism.

Develop a policy statement on rehabilitation.

Exploration of the possible role of the Association in relationship to addictive drugs.

Participate in the White House Conference on Aging.

Give attention to health needs of the aged with a special regard for relationship of health needs to other programs.

Take a systematic look at recommendations of the Commission on Chronic Illness and consider enunciation of the steps to be taken by aging persons for health maintenance and medical care.

Take a systematic look at reports from the National Health Survey, reports of the Commission on Aging of AMA, and publications of the American Heart and Cancer Associations.

Take steps to develop the epidemiology of chronic diseases.

Preparation of a policy statement on medical aspects of rehabilitation.

Preparation of a policy statement on public health and alcoholism.

Environmental Health

Analysis of state of working knowledge in environmental sanitation.

Revive and extend subject of healthful aspects of housing.

Programs of monitoring radioactivity in the environment.

Methods for measurement of effectiveness and efficiency of environmental sanitation programs.

Formulation and publication of conceptual material on scope of environmental health.

Development of proposal for a "National Congress on the Environment" and arranging suitable sponsorship and financial backing.

Health Services in Disaster

Outline a program for the Association responsibility for natural and military disaster including encouragement of public health people to get into and do all they can in civil defense.

Take responsibility for outlining APHA position regarding shelters.

Preparation of resolutions on health department role in disaster planning.

Medical Care Administration

Seek funds and staff to carry out the Medical Care Study Proposal.

Explore the effects of public health on medical care with a few health departments, and develop an extension of the statement, "Public Health Role in Medical Care."

Mental Health

Preparation of a manual of "Control Methods for Mental Disorders."

Development of an effective liaison with such national organizations as the American Psychiatric Association, the National Institute of Mental Health and the American Orthopsychiatric Association.

Advising and assisting in the development of standards for mental health programs and professional standards for personnel in community mental health programs.

Stimulating public health types of research in the mental health field.

Making suggestions for curricula in schools of public health in relation to the control of mental disorders.

Public Health Administration

Holding a Second National Conference on Evaluation in September which will produce a new document, namely, "Indices for Community Health Services."

Publication of a manual on "Administration of Community Health Services."

Publication of a revised "Guide for the Medical and Public Health Nursing Supervision of Tuberculosis Cases and Contacts," by the subcommittee.

Development of a brief guide on poison control activities for state and local health departments by the Subcommittee on Chemical Poisons.

Work on completion of a survey on the present utilization of legal services by state and provincial health departments by the Subcommittee on Public Health Law.

Review the "Guide to a Community Health Study"; analysis of completed studies—revision.

Review of terminology in evaluation.

Radiological Health

Preparation of model rules to implement NCRP codes.

Public education and training.

Disseminating information to state health departments.

ROSCOE P. KANDLE, M.D.
Chairman

Dr. Kandle is State Health Commissioner, Department of Health, Trenton, N. J.

Report of the Chairman to the Governing Council at the Eighty-Eighth Annual Meeting of the American Public Health Association in San Francisco, Calif., October 30, 1960.

CRITERIA FOR REVIEW OF PROGRAM AREA COMMITTEES BY THE TECHNICAL DEVELOPMENT BOARD—Supplement

Purpose of the Technical Development Board

The Board "shall be responsible for initiating and assisting in development of balanced activities by the Association in all aspects of the public health program. It shall coordinate existing committee activities and suggest establishment of new committees as desirable. No standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council."*

Structure of the Technical Development Board

"There shall be a Technical Development Board composed of the chairmen of the Standing Committees on Evaluation and Standards, Professional Educa-

* From the By-Laws of the American Public Health Association.

tion, and Research Policy, the chairmen of the Association Committees concerned with public health program areas and six Fellows appointed by the Executive Board, no two of whom are to be from any one Section and not more than two from any professional category, and one of whom it is to designate as chairman."*

A continuing concern exists regarding relationship to Sections. The Board recognizes a continuing need for more effective relationships so that information and suggestions for activities may flow freely in both directions between Sections, the Board, and the Program Area Committees. Devices used to date include meeting of members of the Board with Section Councils, meetings of Section representatives with the Board; distribution of minutes of the Board to members of Section Councils, interlocking membership in Sections, on the Board, and on Program Area Committees.

Special need was noted for follow-up on the above meetings and devising of improved methods to encourage cross-referral, flexibility, and optimum freedom of motion, and without dominance.

Program Area Committees

These are multidisciplinary committees whose membership need not be limited to Fellows or members of the Association. The committees should relate freely to each other, to Sections and to Standing Committees. Appropriate recommendations for their continuation or discontinuance should be made to the Executive Board. These committees are impermanent. The name, number and charge of these committees will be reviewed from time to time, and at least annually by the Technical Development Board.

Program Area Committees, their specified charge and the duration of their existence are recommended by the Technical Development Board to the Executive Board. The Executive Board continues and discontinues Program Area Committees, appoints their members, and establishes their charge.

Suggested Functions of Program Area Committees

1. To serve as a fact-finding, standard-developing and action-promoting unit in a designated field of interest.
2. To recommend program policy.
3. To advise on the Association's position on specific legislation as it relates to program.
4. To serve as an information center in fields of special interest.
5. To recommend new activities for itself, its successor, or for other units of the Association.
6. Recommendation to dissolve the committee.

Suggested Criteria for a Program Area Committee

A high number of affirmative answers to the following would indicate desirability for establishment or continuance of a Program Area Committee:

1. Does adequate development of the subject require skills transecting any one Association Section?
2. Is the subject one which is not being effectively dealt with by any other committee or by a Section?
3. Is the subject timely? Is it of immediate particular importance?
4. Is the subject an essential or important next step in the development of public health? Is it a "new" public health problem?
5. Does it contribute to the logical development of the profession?
6. Is the subject a stubborn problem in public health?
7. Is the subject of unusual complexity?
8. Is the subject of unusual urgency?
9. Is the subject in need of a public spotlight; does it need at the moment some greater degree of prestige?
10. Are there needs for standards to be developed in the subject area?
11. Is the subject sufficiently discrete and

* From the By-Laws of the American Public Health Association.

unique as to prevent its being handled adequately in an existing Program Area Committee or other Association unit?

12. Is there need for a plan for research?

Subcommittees of Program Area Committees

Subcommittees should be created by the Program Area Committee on approval of the Technical Development Board and Executive Board for completion of a specific task and should be dissolved on its completion. Even if one or more additional tasks are recommended the subcommittee should be discontinued and a new one formed (if desired) for the new charge in order to provide greater freedom in selection of membership and to supply further stimulus to work against a deadline.

Each subcommittee should:

1. Be charged with a specific task.
2. Be given a time limitation within which it is anticipated the task can be completed. (Extension could of course be granted.)
3. Be dissolved on completion of the task.

Suggested Review of Program Area Committees

Review by the Technical Development Board should be done from time to time as a committee completes its task and presents its report and periodically for all Program Area Committees.

As a part of each report the committee should be asked to give careful note to the implications for Sections and for other units of APHA or to the Association as a whole.

On making its review the Board, in addition to applying the suggested criteria, should ask:

1. What is the significant task?
2. How is the current membership progressing vis-à-vis the charge?
3. Is the name of the Program Area Committee substantially different from Section names; i.e., does it denote a proper program area? If not, is there real justification for continuance of the Program Area Committee?
4. Does the original need for the committee still exist?
5. Has the committee completed the task or tasks assigned it? What are the target dates?
6. Does the Board have additional tasks to recommend to this specific committee?
7. Is the Program Area Committee carrying out the work it was set up to do?
8. Could the work of the committee now be done as effectively elsewhere in the Association?
9. Would greater effectiveness result if the committee were now combined with some other existing Program Area Committee?
10. Is a new Program Area Committee being created for work which logically belongs in an existing committee?

Work Parties of the Technical Development Board

Work parties are temporary (less than one year), ad hoc creatures of the Board, used to expedite the work of the Board by exercise of composing or editorial duties or exploration, and charged with developing:

a program proposal,
a conceptual paper,
suggested arrangements.

Discussion

Continuing questions about relationship to Sections and their professional programs were discussed. Among these was the question of the Technical Development Board's responsibility in regard to a task originated by a Section or transferred to it from the Board or other Standing Committees.

American Public Health Association

COMMITTEES 1960-1961

There is no better introduction to the listing of the Association's committees, subcommittees, and study groups than an acknowledgment of the work of the hundreds of members and Fellows who serve on the committees and those who have served in the past.

Among the committees and groups listed are those concerned with the formulation of policy and guidance of the complex administrative affairs of the Association and of the sections, as well as those carrying forward the scientific and educational aspects. A cursory glance at the listing reveals the range of Association interests and activities and the major concerns of the public health profession today.

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Detroit, Michigan

November 13-17, 1961

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WISCONSIN ASSOCIATION FOR PUBLIC HEALTH, Paul Weis, RR No. 2, Waunakee
WYOMING PUBLIC HEALTH ASSOCIATION, Lee Holder, P. O. Box 2203, Cheyenne
MIDDLE STATES BRANCH, APHA, Thelma Luther, Dept. of Health, Des Moines 19, Iowa
SOUTHERN BRANCH, APHA, M. L. McDonald, Dallas Health Museum, Dallas 24, Tex.
WESTERN BRANCH, APHA, Robert G. Beaumier, 1309 Smith Tower, Seattle, Wash.

Annual Meeting No. I: New Jersey

The New Jersey Public Health Association held its first Annual Meeting in Asbury Park on October 25, 1960. Approximately 500 people attended. The program consisted of sessions on nutrition, maternal and child health, comparative medicine, and environmental health.

The New Jersey Nutrition Council co-sponsored the session on nutrition. Elmer L. Severinghaus, M.D., professor of public health, Columbia University School of Public Health and Administrative Medicine discussed the nutritional aspects of fertilizers and the relationship to public health of pesticides and preservatives in current use. Other speakers were Olaf Mickelsen, Ph.D., chief, Laboratory of Nutrition and Endocrinology, National Institute of Arthritis and Metabolic Diseases, Bethesda, Md.; E. W. McHenry, M.D., University of Toronto; Sami Hashim, St. Luke's Hospital, New York City; and Dr. Eliza-

beth Munves, professor of nutrition, New York University.

Keen interest was shown in the program on comparative medicine. Oscar Sussman, D.V.M., of the New Jersey State Department of Health, who developed the program, discussed the increasing value of studying animal reactions and diseases with respect to human counterpart reactions and diseases. Richard E. Shope, D.V.M., Rockefeller Institute for Medical Research, spoke on "Contributions of Animal Research to Medicine." Comparative cardiology and human cardiovascular disease was the topic of David K. Detweiler, D.V.M., associate professor, School of Veterinary Medicine, University of Pennsylvania. S. A. Goldberg, M.D., D.V.M., pathologist, United Hospitals of Newark, reviewed the history of the Federal Meat Inspection Act. Earl C. Chamberlayne, D.V.M., veterinarian with the PASB/WHO, Washington, D. C., told of international animal-human disease research. James H. Steele, D.V.M., chief of the Veterinary Public Health Section, Communicable Disease Center, looked at the subject in the light of present-day public health problems.

Renee Zindwer, M.D., chief, Bureau of Maternal and Child Health, New Jersey State Department of Health, moderated the maternal and child health session. Virginia Apgar, M.D., of the National Foundation, New York City, presented a paper on congenital abnormalities; and Robert H. High, M.D., Temple University in Pennsylvania, one on primary tuberculosis and its treatments.

Four topics were explored at the session on environmental health: air pollution control, by George Laubach, health officer of Elizabeth; weed control, by Donald A. Schallock, Rutgers University; mosquito control, by Robert L. Van Note, superintendent of the Morris County Mosquito Commission; and the problems of sanitary land fills, by Conrad Ringlieb, operator of such a fill at Pine Brook, N. J. Francis B. Elder, engineering associate, American Public Health Association, presided at the session.

Mr. Elder succeeded John Hanson as NJPHA president. Other officers for 1960-1961 are:

President-Elect—Edward Gerner, health officer, Orange

First Vice-President—Winona Darrah, director, Monmouth County Organization for Social Service

Second Vice-President—Joseph O. Lampen, Ph.D., director, Institute of Microbiology, Rutgers University, New Brunswick

Secretary—Kenneth Carhart, chief, Bureau of Examination and Licensing, State Health Department

Treasurer—Charles A. Kientz, health officer, North Arlington

Miss Martha Luginbuhl, formerly of the staff of the American Public Health Association, was appointed editor of the NJPHA Newsletter.

Tennessee: No One Etiologic Agent

The Tennessee Public Health Association and the Conference of Tennessee Public Health Workers met December 7-9, in Nashville. Delegates, 650 strong, looked into the Problems of the Aging Population, with emphasis placed on cardiovascular diseases.

At the first general session James A. Crabtree, M.D., dean, School of Public Health, University of Pittsburgh, gave a paper on the conference theme. Elliot V. Newman, professor of experimental medicine, Vanderbilt Medical School, spoke on heart disease control from the viewpoint of the private physician. Berwyn F. Mattison, M.D., executive director, American Public Health Association, addressed the same topic from the health officer's vantage point. Papers on the relationship of nursing and housing to an aging population were presented by Lola M. Hanson, nursing consultant, Public Health Service, Region III, Charlottesville, Va., and Eugene L. Lehr,

chief, Accident Prevention Program, PHS, Washington, D. C.

Heart disease control, Dr. Mattison said, is "complex because there is no one etiologic agent to be attacked and eliminated; difficult because every organizational unit of a health department has something to contribute but in quite different and sometimes unrelated ways." High on the list of special competencies of health departments in heart disease control is measurement of the problem. He described many recent advances in measuring technics and several other factors — e.g., physical, physiological, epidemiological, and educational — that the health department is equipped to bring into play in these control programs. Our resources are great, he said. "We hope that as they increase some day in the future, public health workers can look back and say 'Why, of course, the conquest of heart disease was simple. Why didn't they do it earlier?'"

The seven Sections each met twice during the conference, some jointly. Several built their scientific programs around the annual meeting theme. William E. Cole, Ph.D., professor of sociology, University of Tennessee, Knoxville, spoke to the health officers on sociology of aging. The nurses heard from Geraldine Piper, chief nutritionist, Division of Chronic Diseases, PHS, Washington, D. C., about the aged's nutritional problems.

R. B. Turnbull, M.D., outgoing president, made his official address to TPHA at the closing general session. R. H. Hutcheson, M.D., commissioner of public health for Tennessee, awarded certificates of 30 years' meritorious service in the fie'd to 21 persons. Frank L. Cheney, sanitation consultant to the state health department was inducted as 1960-1961 president. Other officers are:

President-Elect—A. B. Shipley, M.D., director, East Tennessee Regional Health Office, Knoxville

Vice-President—R. B. Turnbull, M.D., director, West Tennessee Tuberculosis Hospital, Memphis

Secretary-Treasurer—C. B. Tucker, M.D., director, Division of Preventable Diseases, Tennessee Department of Public Health, Nashville

Delegate to APHA Governing Council—L. M. Graves, M.D., director, Memphis-Shelby County Health Department, Memphis

Alternate Delegate to APHA—Nobel Guthrie, M.D., Dr.P.H., Memphis-Shelby County Health Department, Memphis

Connecticut: Panel on Retardation

The morning session of the Connecticut Public Health Association's 44th Annual Meeting (Newington, November 17, 1960) was given over to discussion of polio. Dorothy Horstmann, M.D., associate professor of preventive medicine and pediatrics at Yale, spoke on the current status of the live vaccine and recommended immunization of newborn babies in hospitals in a mass program. Touching briefly on her trip through Russia, she said there was no truth to the report that some 11 million persons had been forced into the Sabin vaccine test program there. James C. Hart, M.D., M.P.H., director, Preventable Diseases Division, Connecticut State Department of Health, reported on the state's polio program.

At the luncheon, Martha L. Clifford, M.D., M.P.H., director, Community Health Division of the State Health Department, presented the 1960 C-E.A. Winslow Award to Alfred L. Burgdorf, M.D., M.P.H., Hartford's health director. Anthony M. -M. Payne, M.D., new chairman, Department of Epidemiology and Public Health, Yale School of Medicine, spoke on the future of the department.

"Meeting the Needs of the Mentally Retarded" was the theme of the afternoon session's panel. This was chaired by Bert W. Schmickel, deputy commissioner, Office of Mental Retardation, State Health Department. Panel members and the titles of their papers: Charles P. Fonda, Ph.D., director, Psy-

chological Services, Mansfield State Training School, "Nature of Mental Retardation"; John A. McGuire, executive director, Connecticut Association for Retarded Children, "Statewide Needs and Resources"; Ruth Woodfall, R.N., New Haven Community Program for Retarded Children, State Health Department, "How the Public Health Nurse Can Help"; Mrs. John R. McElraevy, former president, Manchester Association for Retarded Children, "A Parent's View of the Problem"; and Stanley Meyers, chief, Community Services, Office of Mental Retardation, State Health Department, "Development of Home Strengthening Services."

Harold S. Barrett, M.D., M.P.H., deputy state health commissioner, succeeded Stanley E. Wedberg, Ph.D., chairman, Department of Bacteriology, University of Connecticut, as CPHA president. President-elect is Dorothy Y. Kirk, R.N., M.P.H., New Haven Health Department. Robert W. MacCalmont, M.D., M.P.H., Westport's health director is the new vice-president.

Florida: Future Labors Challenge

The Florida Public Health Association convened for its 32nd Annual Meeting in Miami Beach, October 13-15, attracting 727 registrants. Nathan J. Schneider, Ph.D., FPHA president and director of the state's Bureau of Laboratories, presided at the first general session. This was the occasion for "A Look Toward the Future" with Malcolm H. Merrill, M.D., president of APHA, as guide and keynoter. Dr. Merrill predicted continued success in the fight against disease, but warned delegates that the problems created by a rapidly growing population, air and water pollution, atomic energy, mental illness, and old age would multiply and continue to claim their attention in the future. Lucile Petry Leone, R.N., Assistant Surgeon General, PHS, followed Dr. Merrill with a paper on the "Role of the Public Health Nurse in Home Nursing Care."

At another general session Maurice Provost, Ph.D., director of Florida's Entomological Research Center, reported on state and federally supported projects through which better methods of mosquito control are being found. He reminded his listeners that only 1.4 per cent of the potential mosquito crop ever matures into biting insects; nature helps control the rest, using the larvae as food for other creatures, including tarpon. The epidemiological approach to mental illness and general problems in environmental pollution were discussed at other sessions.

FPHA officers for 1960-1961 are:

President—H. Duke Peters, director, Division of Sanitation, Jacksonville Health Department

First Vice-President—G. Floyd Baker, health educator, Division of Health Information, State Board of Health, Jacksonville

Second Vice-President—Mertie LeClaire, R.N., supervising nurse, Clay County Health Unit, Green Cove Springs

Secretary—Everett H. Williams, Jr. (re-elected), director, Bureau of Vital Statistics, State Board of Health, Jacksonville

Treasurer—Betty Gardiner, director, Public Health Education, Pinellas County Health Department, St. Petersburg

Section chairmen elected were: Health Education, Thomas Hunter; Public Health Nursing, Claire Redfield; Mental Health, Thomas Rich; Laboratory, Robert A. Graves; Clerical, Administrative and Fiscal, Miles Dean; Health Officer, J. B. Hall, M.D.; Sanitation, Lee Reed; Sanitary Engineering, Robert L. Quick. A new section on Medical Care was approved.

FPHA Meritorious Service Awards were given to Wilson T. Sowder, M.D., state health officer, and Francis P. Meyer, D.D.S., a member of the State Board of Health.

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EMPLOYMENT SERVICE

The following pages present information for those seeking public health personnel and for those seeking positions in public health. Other information concerning vacancies and personnel available is on file in the Association office. Anyone wishing to have the benefit of this additional information can obtain it by writing to the Vocational Counseling and Placement Service of the Association.

Advertising space in these pages is available at special rates for the use of employers or individuals. The charges are $5 for the first 50 words or fraction thereof and $1 for each additional 10 words or fraction thereof. There is no charge to members or Fellows of the Association who desire to utilize the **Positions Wanted** portion of these pages. **Closing date** for receipt of advertisements is the first of the month preceding the desired month of publication. **All correspondence should be sent to the American Public Health Association, 1790 Broadway, New York 19, N. Y.**

POSITIONS AVAILABLE

Medical Health Officer—with M.P.H.; for Pima County, Ariz. Established health department with the city of Tucson, population about 210,000, as headquarters. Salary $1,071-$1,300 commensurate with experience. Write Hugh H. Smith, M.D., 3134 Via Palos Verdes, Tucson, Ariz.

Chief Assistant Public Health Officer—Assists in the administration of a modern health program and facility serving a community of approximately 300,000 in Kern County, Calif. Requires California M.D. license or eligibility, M.P.H., and total of five years' experience in medicine with three years of recent experience in public health. Desirable professional climate with excellent employee benefits. Salary $12,528-$15,228 per annum. Starting level commensurate with qualifications. Contact Kern County Personnel Department, Civic Center, Truxtun at Chester, Bakersfield, Calif.

Institution Medical Services Director—Position with the Hawaii Department of Health. Responsible for the medical, dental, laboratory, and nursing care services in an institution for the mentally retarded. Requires eligibility for certification by the American Board of Pediatrics, Internal Medicine, or Psychiatry and Neurology, and eligibility for a medical license in Hawaii. Salary $10,032-$12,804 per annum. Write to Recruiting and Examining Division, Department of Personnel Services, 825 Mililani St., Honolulu 13, Hawaii.

Crippled Children's Physician—Position with Hawaii Department of Health. To administer program for the prevention of children's disease and deformity and to direct medical care program for crippled children. Requires one year of experience in a public health agency or one year of public health graduate study, and eligibility for certification by the American Board of Pediatrics, Orthopedics, Neurology, or Plastic Surgery, and license to practice medicine in Hawaii. Salary $11,064-$14,112 per annum. Write to Recruiting and Examining Division, Department of Personnel Services, 825 Mililani St., Honolulu 13, Hawaii.

Public Health Director—for Public Health Department in Portland, Maine, community of 80,000 and center of metropolitan area of about 150,000. Department staff of 37 engaged in progressive public health program, including active housing inspection and enforcement of minimum housing standards and environmental sanitation. Council-manager form of government since 1923. Health department enjoys excellent relationships with private and voluntary agencies, and a real civic interest in public health matters exists. Health department budget for 1960 totaled $160,000. Portland offers an unparalleled opportunity for constructive professional work and for pleasant living. Degree in medicine required. Degree in public health or willingness to obtain graduate training in the field is desired. Salary open. Write Julian H. Orr, City Manager, City Hall, Portland, Maine.

Public Health Dentist—Outstanding opportunity to become associated with one of the nation's leading public health dental programs. The Philadelphia Department of Public Health is now accepting applications for the position of Public Health Dentist I to serve as chief, Research and Resources Section, Division of Dental Health. Opportunity for clinical and field investigations are dependent primarily on the abilities and interest of the individual. Duties include assisting the director of the Division of Dental Health in the development, planning, and administration of a city-wide dental health program emphasizing the care and treatment of children's teeth. Salary $10,158-$11,126. Requirements: graduation from an accredited school of dentistry, including or supplemented by completion of courses in pedodontia; completion of graduate work in an approved school of public health to the level of a master's degree in public health; two years of professional experience in dentistry, one year of which shall have

included experience in a supervised public health dental program. Additional information and an application form may be obtained by contacting David A. Soricelli, D.D.S., Director, Division of Dental Health, Philadelphia Department of Public Health, 500 South Broad St., Philadelphia 46, Pa.

Physician—Wanted immediately to serve as director of a well established tricounty health department located at the eastern tip of the upper Peninsula of Michigan. Excellent personnel policy. Eligibility for Michigan licensure. Write Jerald A. Peters, Chippewa-Luce-Mackinac Health Unit, Sault Ste. Marie, Mich.

Health Commissioner—County unit, serving 100,000, Hudson River Valley, with headquarters at Kingston, N. Y. This is an established unit with a well trained staff of 50. Experience and training for health officer required. Salary $14,000, plus necessary travel. For details write to Mr. Harry Kaplan, President, Ulster County Board of Health, 15 Main St., Kingston, N. Y.

Pediatrician—for State Health Department. To act as pediatric consultant within the agency and work with professional and lay groups in the field. Included in work: hospital standards, school health problems, statistical studies, future program planning. Starting salary $12,240. Ohio medical license, one-year internship, at least two years' graduate training required; preferably Board of Pediatrics or eligible. Civil service position, vacation, sick leave, annual salary increments, and retirement plan. Staff appointment to state university if eligible. Address inquiries to Division of Child Hygiene, Ohio Department of Health, Columbus 15, Ohio.

District Health Officer—Public health administrator of a district area; district epidemiologist. Plan, organize, supervise work of professional staff consisting of engineers, nurses, sanitarians, nutritionists, dental hygienists, health educators, and social workers. Requires M.D. and M.P.H. degrees and license to practice medicine in Wisconsin. Salary $15,072-$16,872 per year with two years of approved residency in preventive medicine beyond M.P.H. degree. Civil service, vacation, sick leave, Social Security, retirement, group health and life insurance benefits, travel allowance. For applications and further information write R. J. Siesen, Personnel Officer, State Board of Health, State Office Bldg., Madison 2, Wis.

District Health Officer—Public health administrator of a district area; district epidemiologist. Plan, organize, supervise work of professional staff consisting of engineers, nurses, sanitarians, nutritionists, dental hygienists, health educators, and social workers. Requires M.D. and M.P.H. degrees and license to practice medicine in Wisconsin. Salary $12,072-$15,072 per year with no residency training beyond M.P.H. degree. Civil service, vacation, sick leave, Social Security, retirement, group health and life insurance benefits, travel allowance. For applications and further information write R. J. Siesen, Personnel Officer, State Board of Health, State Office Bldg., Madison 2, Wis.

Health Officer—for newly created Waukesha County Health Department, with population of 158,000. Require M.D., M.P.H., Wisconsin license. Starting salary $15,000; generous fringe benefits. County seat within 20 miles of Milwaukee. For application and information write Thomas Schwaab, Secretary, County Health Committee, Court House, Waukesha, Wis.

Public health positions in Milwaukee, Wis.

Superintendent of Bureau of Preventable Diseases and Medical Services—$13,800-$16,560. To direct a bureau having diversified services and a 1961 budget appropriation of $846,914. Position involves administration, epidemiology, and research in preventable diseases, including some chronic diseases. Requirements: M.D. degree and certification, or eligibility for certification, by appropriate board in preventive medicine and public health or internal medicine; two years' full-time experience in public health practice, occupational health or equivalent; experience in methodology of research; training in epidemiology or willingness to obtain such training while in the employ of the Milwaukee Health Department; United States citizenship; eligibility for Wisconsin medical license. Employment is possible while awaiting licensure.

Supervisor of Mental Hygiene—$12,600-$15,120. To serve as consultant in child psychiatry to physicians and public health nurses employed by the Milwaukee Health Department and guidance personnel employed by the city of Milwaukee public schools. Clinical examination and diagnosis of limited number of adults referred by the Medical Clinic of the Health Department and children used for case study method of teaching public health physicians and nurses. Requirements: M.D. degree and certification, or eligibility for certification, by American Board of Psychiatry; special interest and training in child psychiatry; United States citizenship; eligibility for Wisconsin medical license. Employment possible while awaiting licensure.

Superintendent of Public Health Laboratories—$11,460-$13,800. To plan and direct the activities of the Bureau of Laboratories having bacteriological, virological, and chemical divisions, in which a total staff of 21 persons are employed. Requirements: M.D. or Ph.D. degree with special training and experience in bacteriology, virology, and chemistry; at least three years' responsible employment in a large hospital or public health laboratory conducting a wide variety

of bacteriological, serological, tissue culture, and chemical examinations.

Public Health Engineer II or Public Health Biologist—$7,920-$9,480. To serve as consultant to sanitarians and to plan and conduct special investigations of technical problems. Requirements: master's degree in engineering and two years' experience as public health engineer; or Ph.D. degree in biological sciences with at least two years' employment devoted principally to investigative work.

Nutritionist—$5,808-$6,912. To plan and direct the Health Department's nutrition program, including inservice training of public health physicians and nurses, training of nursing home personnel, and cooperating with home economists employed in the local school system. Requirements: college graduation with major courses in nutrition and one year of graduate study leading to a master's degree in public health nutrition.

All positions are under civil service. All positions provide for paid vacation, paid sick leave, liberal pension plan (incorporated to first $4,800 with federal Social Security system), medical and hospital insurance, and group life insurance. Write to E. R. Krumbiegel, M.D., Commissioner of Health, Milwaukee Health Department, 841 North Broadway, Milwaukee 2, Wis.

Public Health Nurses—Salary range $395-$481 (five-step range). College degree in public health nursing. Experience in public health not necessarily required. PHN certification required to meet State Health Department nursing requirements. Three weeks' vacation per year. Retirement and Social Security benefits. Work 37½ hours per week. Thirty-five miles north of San Francisco. Generalized program. Contact Henry G. Mello, M.D., Solano County Health Officer, 228 Broadway, Vallejo, Calif.

Public Health Nursing Director—County Health Department. Bachelor's degree and five years' responsible experience. Also, **Public Health Nurse Supervisor**—Three years' experience. Salaries open. Write Director, Ingham County Health Department, 221½ West Washtenaw St., Lansing, Mich.

Community Mental Health Consultant—for New Mexico state-level mental health nurse consultant position in Santa Fe. Graduate degree and experience required. Entering salary $605. Excellent climate, recreation, cultural events. Write Merit System Director, Box 1058, Santa Fe, N. M.

Public Health Nurse Superintendent—Responsible for the planning and execution of policies and procedures of a comprehensive public health nursing program. Must possess a degree in nursing from an accredited college, and a master's degree in public health. Annual salary $7,056. Attractive fringe benefits. Apply Room 203, City Hall Annex, Norfolk, Va.

BACTERIOLOGIST

Opening in chemotherapeutic research in expanding midwestern pharmaceutical firm.

The opening is in bacteriological research. Experience in an industrial laboratory desirable but not required.

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Public Health Nurse III (District Advisory Nurse)—Give guidance and counseling to all public health nurses in a multiple-county area regarding community organization and relationships, program planning, public health nursing technics, records, and reporting. Responsible for inservice education program for local public health nurses and evaluation of nursing services. Salary range $5,700-$6,780, plus travel allowance. B.S. degree with major in public health nursing and three years' generalized experience as a public health nurse. Special requirement: registration or eligibility therefor as a registered nurse in Wisconsin; certification or eligibility for certification as a public health nurse in Wisconsin. Write Miss Ione M. Rowley, Director, Public Health Nursing, 119 Monona Ave., Madison 3, Wis.

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Sanitarian—for hospital. Opportunity in new field of hospital sanitation. To set up procedures and develop training programs for Department of Sanitation personnel. Familiarity with broad field of environmental sanitation preferred. Contact Employment Office, Hackensack Hospital, Hackensack, N. J.

Dietary Consultant—State-wide program in connection with nursing homes. Merit system status, liberal vacation, sick leave, and group insurance. Excellent working conditions. Salary $4,920-$6,144. Write Director of Personnel, Virginia State Health Department, Richmond, Va.

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Physical Therapist Consultant—Statewide program in connection with nursing homes. Merit system status, liberal vacation, sick leave, and group insurance. Excellent working conditions. Salary $4,920-$6,144. Write Director of Personnel, Virginia Health Department, Richmond, Va.

Chief Technologist—Registered ASCP medical technologist with B.S. or M.S. degree and experience or ability to teach students as well as supervise the clinical laboratory department. One hundred and ninety-bed hospital with new, modern, well equipped laboratory facilities. Community of 40,000 on St. Clair River and Lake Huron, 58 miles north of Detroit. Forty-hour week, paid vacation, sick leave, and holidays. Salary open. Apply to Administrator, Port Huron Hospital, Port Huron, Mich.

Public Health Educator—to direct a newly established alcoholism program, including (1) information and referral service, (2) professional education, (3) community education, (4) school health education, (5) community and industrial program development. Beginning salary $6,000-$7,000, depending on qualifications. Write Orville Sauder, Peoria Council on Alcoholism, 4614 North Prospect, Peoria Heights, Ill.

POSITIONS WANTED

On Box Numbers, Address APHA at 1790 Broadway, New York 19, N. Y.

Public Health Sanitarian—Age 30, married. M.S., University of Baroda, India; A.B., zoology, University of Pennsylvania; B.S., sanitary science, University of California; R.S., California, 1958; M.R.S.H., England. Experience of six months in research in San Francisco, and 18 months with the Ministry of Health, England. Desire position as sanitarian in the United States. **Box S-38,** Employment Service, APHA.

Biostatistician—Age 27, male. M.S.; three years' experience in data analysis. Desire position in sociohealth research on a creative level. **Box ST-24,** Employment Service, APHA.

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(1) M.D., Ph.D., public health, experience chief, preventive medicine; chief community medicine, local and regional health officer, 20 years' experience, (2) Health educator, experienced executive director, community welfare organization; M.P.H., 42 years of age.

BOOK REVIEWS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

PSYCHOLOGY: A STUDY OF A SCIENCE. VOLUME 3—Edited by Sigmund Koch. New York, N. Y.: McGraw-Hill (330 W. 42nd St.), 1959. 837 pp. Price, $12.50.

This book consists of 11 theoretical statements, each dealing with the individual and the social context in which he functions. It is the third of a series of volumes being published under the collective title, "Psychology: A Study of a Science." The over-all undertaking is a comprehensive examination of the current status and future directions of the science of psychology. Eighty scientists are contributing; their work will be published in seven volumes. The present volume can be read independently of the series, since it covers all the conceptual and systematic formulations which fall in the general area of personality theory and social psychology.

The fact that an advisory committee representing the American Psychological Association chose as contributors a group of men it regarded as exceptionally well qualified for the task makes this book required reading for psychologists. However, the variety of the contributions is such that it will provide something of interest to persons in other fields. For the clinically oriented, for example, there are important papers by David Rapaport and Carl Rogers. The former offers an attempted systematization of psychoanalysis as a form of psychological theory. The latter presents for the first time the theory of personality underlying client-centered therapy.

Of the 11 papers, five deal primarily with personality, while six treat aspects of social psychology. In addition to those by Rapaport and Rogers, papers in the first group are by Henry Murray, Raymond Cattell and Franz Kallman. Authors in the latter group are Solomon Asch, Theodore Newcomb, Daniel Katz and Ezra Stotland, Paul Lazarsfeld, Herbert Thelen and Talcott Parsons.

The paper of most direct interest to the field of public health is that by Franz Kallman, titled "Psychogenetic Studies of Twins." Summarizing the studies based on one-egg and two-egg twins, he reaches two provocative conclusions: (1) Consistent similarity in basic personality traits is found only in one-egg twins and in them is not erased even by different environments. (2) When psychopathology is observed in one twin, it is also found with high frequency in the second twin of one-egg pairs but with much lower frequency in the second twin of two-egg pairs. This holds for male homosexuality, mongolism, convulsive disease, schizophrenia, manic-depressive psychosis, involutional psychosis, and psychoneurotic reaction potentials.

STUART W. COOK

HENRY E. SIGERIST ON THE SOCIOLOGY OF MEDICINE—Edited by Milton I. Roemer, with a foreword by James M. Mackintosh. New York, N. Y.: MD Publications, Inc. (30 East 60th St.), 1960. 397 pp. Price, $6.75.

This collection of 31 papers and essays is representative of the contribution made to the recognition and better understanding of the social function of medicine by one of the greatest historians and philosophers of medicine. Professor Sigerist, a European by birth and upbringing, an American by adoption while he was Director of the Institute of the History of Medicine at Johns Hopkins for over twenty years, was a world citizen in outlook. Physician and philologist, historian and

humanist, he was a scholar who believed in putting his insight and wisdom to effective use in programs of action. His writings are models of lucid discussion of the forces in medicine and society which shaped the present and which presage the future. The editor's objective was to make available in one volume the principal Sigerist papers in medical sociology not to be found elsewhere in book form.

As the editor points out, Sigerist's approach to medical sociology was concerned with aspects quite different from those which engage the attention of most American sociologists now working in medical settings. His interests in this field were focused on the social tasks of medicine, the current patterns and problems of medical care throughout the world. While he drew attention to contemporary issues and methods of health service organization, his interests were not exclusively organizational. For example, this collection contains such papers as "The Special Position of the Sick" and "Problems of Historical-Geographical Pathology." Other papers, such as "The Physician and his Environment" and "Medical Societies, Past and Present," provide insight into present problems of role and function facing professional persons in relation to public policy.

Sigerist had a passionate belief in the desirability and feasibility of developing a social framework whereby high-quality medical care would be available to all the people. In the best public health tradition he added, "Medicine must of necessity become preventive medicine. There is no point in letting people break down and suffer from preventable diseases. There are enough sources of suffering in the world that may not be prevented so easily."

These concepts are cogently presented in this book. Among the papers grouped under the title "General Essays" are "The Place of the Physician in Modern Society" and "An Introduction to the Economics of Medicine." In the section entitled "Europe" are such papers as "From Bismarck to Beveridge: Developments and Trends in Social Security Legislation" and "Twenty-five Years of Health Work in the Soviet Union." The breadth of Sigerist's knowledge and interests is shown by the essays in the section "America," which range from "The Cost of Illness to the City of New Orleans in 1850" to "Group Health Plans in the United States." Essays in other sections are equally provocative and insightful whether "Report on India" or "Nationalism and Internationalism in Medicine."

In evaluating this book, I cannot claim the objectivity of the uncommitted, dispassionate reviewer who is reading its contents for the first time. In addition to reading and rereading Sigerist since medical student days, I have had the great good fortune to have known him personally. A warm, vibrant personality, Sigerist was also a great teacher. The essays in this book reflect this. Here is a philosophic guidebook for all those who are interested in the purpose and problems of medicine and public health in modern society.

CECIL G. SHEPS

NUTRITIONAL EVALUATION OF FOOD PROCESSING—By Robert S. Harris and Harry von Loesecke. New York, N. Y.: John Wiley & Sons (440 Park Ave. So.), 1960. 612 pp. Price, $12.00.

Dr. Charles Glen King recently stated, "No nation in history has had a food supply that would compare with our present supply in terms of nutritive value, safety, convenience, stability, variety, attractiveness and availability."

In 541 pages of text and with the aid of 31 other authors, Doctors Harris and von Loesecke have succeeded in summarizing the vast amount of technical information upon which this wonderful food supply rests. The device of using

each specialist in his field and carefully correlating their contributions has resulted in a most valuable book for those active in the nutritional phases of public health.

The book covers food, from its origin, harvesting and handling, through every stage in processing, preserving, and packaging for the consumer's table. The retention of nutrients throughout the varied processes, the devices used for increasing nutrient value, and even the utilization of the nutrients by human beings are fully treated.

No book covering so wide a field can hope to keep up with the rapidly changing field of packaging, but this does not detract from the valuable assistance it will render. Over 2,400 authors and many times this number of references are cited. This is a book that no one in the nutritional field will wish to be long without. FRED C. BASELT

FAMILY PLANNING, STERILITY AND POPULATION GROWTH — By Ronald Freedman, Pascal K. Whelpton and Arthur A. Campbell. New York, N. Y.: McGraw-Hill (330 W. 42nd St.), 1959. 515 pp. Price, $9.50.

Based upon analysis of data obtained through modern sampling and interviewing technics, the authors attempt to interpret the recent upsurge in the U. S. birth rate and to chart its future course. The recent recognition by the APHA of public health responsibility in relation to population growth (A.J.P.H., 49:1703-1704, Dec., 1959) should increase the readership for this methodologically important and strategically useful study.

Unfortunately, the report itself seems difficult to read. This is due in part to use of the special jargon of the demographer-statistician. It is due also to the frequent interpolation of interpretations of results qualified or hedged in such a way as to require the reader to reread everything and then ask himself, "Now, what does this mean?"

Nevertheless, the report reveals much of public health significance and as a whole offers a major contribution to scientific knowledge in this field. "A scientific probability sample of the approximately 17 million wives" in the United States between the ages of 18 and 39 who were white and living with their husbands was interviewed—a total of 2,713 women. The interviews themselves demonstrate something of immediate interest to public health practice (although probably of common knowledge to public health nurses).

The study substantiates the concept that voluntary use of methods to regulate conception is undoubtedly the main factor accounting for changes in family size. However, the significant minority of couples who have more children than they want number in the millions. It is predicted that these groups will evidence an increasing demand for advice and counseling. Another fact of special importance to public health is the extent of impairments in the ability to bear children. A shockingly large number are related to surgery in the genital tract—one out of every ten white couples in the childbearing age groups is estimated to have had such surgery. In general, childlessness today is not by choice but rather due to impairment in the ability to have children. However, the authors claim support for the hypothesis that such impairments are not the cause of the major differences in the number of children actually born to couples in different social and economic groups.

Attention is given to the problem of identifiable fetal wastage—some "640,000 recognized fetal deaths a year"—and its relationship to the ability to bear living children. The opportunity to explore its relationship to the birth of impaired children was apparently missed.

Most of the text is concerned with a very detailed analysis of the interrelationships between family planning,

methods of family limitation attempted, family size, and a series of logical social and economic correlates. Expectations about family size are shown to play an important role in the determination of family size and, therefore, in the prediction of future population growth. With peace and economic stability, present family growth plans are likely to be continued, with a resulting rapid growth in the American population, despite the emphasis on moderate rather than large-sized families.

The importance of continued and expanded family planning services as part of the broadly defined public health services needed in our communities tends to be understated in this very detailed study, although figures on the failures in family planning are given.

The sociological approach to analysis of the effectiveness of different methods of family limitation leads to most interesting conclusions. Despite the potentially great differences in effectiveness, the authors claim that actual differences are small. Those interested in the role of community health agencies in family planning may find this discussion (Chapter 6) worth struggling through. Again it points to education and motivation as fundamental to success in family planning.

JONAS N. MULLER

MEDICAL CARE OF THE ADOLESCENT—By J. Roswell Gallagher, M.D., and the Staff Physicians of the Adolescent Unit. New York, N. Y.: Appleton-Century-Crofts (35 West 32nd St.), 1960. 369 pp. Price, $10.00.

This is a well written and very timely book, bringing together in well organized and readable form present knowledge on the emotional and physical health problems of the adolescent.

Boys and girls between the ages of 12 and 21 are considered as adolescents, and the authors state in the introduction to the book, "It is directed to all who care for their health: general practitioners, pediatricians, internists, various other specialists, college and school physicians, public health workers, nurses and medical students."

The first two chapters discuss in a general way how adolescents differ from children and adults and what their characteristics and needs are, emphasizing that many of the problems facing adolescents arise out of the facts of their normal growth and development.

An excellent chapter follows on normal growth and development in relation to chronological age. The remainder of the book discusses specific medical problems commonly seen in this age group, including acne, athletic injuries, orthopedic defects and epilepsy. One unique and quite valuable contribution which the authors have made is that in discussing each one of the common physical disorders seen in adolescents they include the psychological and emotional problems frequently associated with that type of physical disorder. Throughout the book the authors emphasize that adolescents are different from other age groups. "It is imperative," they say, "that we learn to understand them and to treat them and their ailments in the light of their characteristics."

This is a book which should be valuable to all those working in the field of school or college health as well as to pediatricians and other practitioners of medicine. RUTH E. BOYNTON

THE COMMON SENSE BOOK OF DRINKING—By Leon D. Adams. New York, N. Y.: David McKay (119 W. 40th St.), 1960. Price, $3.95.

This is a book which has long been needed. It is exactly what the title suggests, namely, a common-sense book of drinking. We know that at least two-thirds of the adult population in the United States drink. "The Common Sense Book of Drinking" is mainly di-

rected at the vast majority of those who use alcoholic beverages without creating problems for themselves or others and who have been ignored by scientific writers because the major emphasis today is on problem drinkers. The book discusses alcoholic beverages and their use, is full of interesting and informative material, and explodes many of the myths and fables about the use and effects of alcoholic beverages.

This is recommended reading for all public health workers, for all who drink, and for all who are debating whether or not they should drink.

JOHN R. PHILP

SCIENTIFIC PAPERS AND DISCUSSIONS: Divisional Meeting, Midwest Area District Branches, American Psychiatric Association, Detroit, Mich., Oct. 29-31, 1959—Edited by Jacques S. Gottlieb and Garfield Tourney. Washington, D. C.: American Psychiatric Association (1700 18th St. NW), 1960. 328 pp. Price, $3.00.

The diversity of topics discussed in this compendium of papers is evidence of the growing enrichment of the field of psychiatry. Notable among sections included are those concerned with (1) Community Applications of Psychiatric Knowledge, (2) Problems of Research Design and Reports of Investigative Findings, and (3) The Relationship of Psychiatry to Medical Practice. It appears, therefore, that psychiatry is emerging at an accelerated pace from its stigmatized status of state mental hospital practice and its isolated position of providing psychoanalytic therapy for the privileged few. The emphasis upon research and the relative neglect of theoretical papers concerned with restatements of psychoanalytic formulations also indicate the growth of a scientifically skeptical orientation.

The total exclusion of papers concerned with group and milieu therapy and the application of therapeutic communities in contrast to papers discussing pharmacological treatment are indicative of another important emphasis in psychiatry. In summary, it is worthwhile to read this collection of papers despite the absence of any strikingly original data. CHARLES E. ORBACH

PUBLIC HEALTH IN BRIDGEPORT: Vol. I—Introduction; Mental Health. 75 pp. Price, $1.50. **Vol. II—Public Health Nursing Services.** 53 pp. Price, $1.50. **Vol. III—Dental Health; Bridgeport Department of Health; Chronic Disease and Rehabilitation; In-Patient and Out-Patient General Hospital Care for the Needy; Community Health Organization; Major Recommendations; Cost and Economies of Survey Recommendations.** 186 pp. Price, $2.00. Bridgeport, Conn.: Community Chest and Council (932 Broad St.), 1959. $5.00 for set, plus postage.

This three-volume mimeographed report with printed covers is the result of a public health survey of Bridgeport, Connecticut's second largest city. It is the result of a study done for the American Public Health Association by a survey group under the directorship of Edward Press, M.D., director of field services of the Association. The study was made in 1958 and published in 1959. It attempts to encompass all aspects of community health.

For those interested in a thorough, comprehensive, and carefully written report of an eastern urban area, this publication is worth perusing. Throughout the report comparisons are made with the cities of Hartford and New Haven which, along with Bridgeport, constitute the three largest cities of Connecticut.

The mental health and public health nursing portions are given unusual emphasis. Volume I, in addition to the introductory material, includes the material on mental health. All 53 pages of Volume II are given over to public health nursing.

The mental health study group had for reference previous surveys in the mental health field, three of the state of

Connecticut (1929, 1957, and 1959) and one of Bridgeport (1953).

The mental health portion of the report, under each of its headings, tends to define the area of need, tell of activities in Bridgeport, and make recommendations for improvement; whereas the recommendations in the public health nursing portion are concentrated at the end of that section (Volume II). It is interesting to note that, although public health nursing is splintered among four agencies and one of these (the health department) has public health nurses in two divisions, there was an over-all ratio of one public health nurse to 3,500 population at the time of the report.

There is an excellent last chapter on community health organization containing an analysis of methods for coordinating the combined effort needed for total community health planning and evaluation.

"Major Recommendations" of the study are found on three pages near the end of Volume III.

C. L. WILBAR, JR.

AN INTRODUCTION TO PUBLIC HEALTH (4th ed.)—By Harry S. Mustard and Ernest L. Stebbins. New York, N. Y.: Macmillan (60 Fifth Ave.), 1959. 338 pp. Price, $4.50.

The fourth edition of this volume, now co-edited by Dr. Stebbins, continues to be an excellent primer covering the broad scope of public health problems and activities. Although the format and general content remain substantially the same, the text has been most carefully re-edited. The discussion of statistical analysis and of the precautions to be observed in the interpretation of statistics is an especially welcome addition. Other major new features include material on radiological health and atmospheric pollution. The references after each chapter have been considerably enlarged and improved.

One might have hoped that the novice in public health, for whom this book is particularly valuable, would be exposed to a view of the more fundamental unsolved health problems we face in this decade. Only passing allusion is made to the problems occasioned by overpopulation and increasing longevity despite the unease that pervades the world because of them. The widespread use of new chemicals in industry, as food additives and for domestic use, is not mentioned as a potential health hazard. The rapid movement of population and the development of new suburban areas, together with the health problems engendered thereby, are not considered. In the classroom the American student raises these questions, as well as those pertaining to cigarettes and lung cancer, rheumatic fever prophylaxis, accident prevention, and poison control.

Nonetheless, in this new edition we shall continue to have at our disposal an invaluable tool in orientating the student, the new member of the health department, and the member of the advisory board. The clear and logical presentations, the superb phraseology, and the provocative use of everyday occurrences make the reading of this text an enjoyable as well as an informative experience. JESSE B. ARONSON

WATER SUPPLY AND SEWERAGE (4th ed.)—Ernest W. Steel. New York, N. Y.: McGraw-Hill (330 West 42nd St.), 1960. 655 pp. Price, $11.00.

In reviewing the fourth edition of "Water Supply and Sewerage" by Professor Steel, it is with pleasure that I personally can answer the question, "Is this a book I should read?" with an objective affirmative answer. Not only has this edition brought up to date, insofar as practical, the technology of water supply and sewerage, but it provides an excellent text for engineering schools to use for their students and also a systematic reference for consulting

sanitary engineers, public works officials, and sanitary engineers in the field of public health. Further it will give water and sewage plant operators an excellent reference book.

One of the most objective paragraphs in the book, in my opinion, is paragraph 1-1 defining the work of the sanitary engineer, which briefly but clearly outlines the place of the sanitary engineer in the water contact field. It also touches upon his responsibilities in the air contact. Another useful addition to this book is the problems given after each chapter; I believe this will develop the thinking of the student and guide others who use the book.

If I may inject a negativism, I will confess that I reviewed this edition attempting to find omissions or flaws, and, while I have not as yet checked it line for line, I did find many subjects covered and covered very well that I had thought might not be included.

In our explosive technology, by the time a new book is published, it is almost out of date, but I find this book nearly as up to date as any that could be published. I should like to compliment Colonel Steel, the McGraw-Hill Company, and the American Public Health Association for their contributions and to recommend that the book be given broad recognition in colleges, technical societies, and other organizations.

DAVID B. LEE

PSYCHOANALYSIS AND CONTEMPORARY THOUGHT—Edited by John D. Sutherland. New York, N. Y.: Grove Press (64 University Place), 1960. 149 pp. Price, $1.45 paper; $3.45 cloth.

This collection of six essays was originally delivered to the public as a group of lectures during a celebration of the centenary of Freud's birth held by the British Psycho-Analytical Society. Since they are addressed to a non-psychoanalytic audience, a minimum of technical terminology was employed. In addition, they are unusually clearly and simply written, considering the complexity of the subject matter. The range of topics to which applications of Freud's hypotheses and postulates have been extended is in itself a tribute to the genius of one of the seminal thinkers of the past century.

The essay, "Psycho-Analysis and the Current Economic Crisis," by Elliott Jaques, although presenting an original approach to the understanding of industrial conflict, also exemplifies the limitations of a psychoanalytic conceptual model when applied to complex social phenomena. It does assist in clarifying some of the irrational bases for industrial conflict. However, a variety of other relevant variables such as class conflict, the power structure of the modern corporation, and the social values associated with different forms of economic organization, among others, also enters into the determination of wages.

In summary, this compilation of essays is recommended for a pleasant, stimulating evening of reading.

CHARLES E. ORBACH

GROUP PROCESSES: TRANSACTIONS OF THE FIFTH CONFERENCE — Bertram Schaffner (editor). New York, N. Y.: The Josiah Macy, Jr. Foundation. 196 pp. 1960. Price, $4.50.

This work contains three presentations, with discussion following each, on "Experimental Aspects of Pediatrics," "The Analysis of Behavior in Terms of Control Systems," and "The Cult as a Condensed Social Process." Some readers will undoubtedly prefer longer reports of the formal presentations and less emphasis on the preservation of informal give-and-take discussion. The same criticism has been made of previous publications of the Josiah Macy, Jr. Foundation conferences. But criticize its format as you will, this book is full of stimulation and sparkle.

EFFECTIVE REPORT WRITING: For Business, Industry and Government—By Norman B. Sigband. New York, N. Y.: Harper & Brothers (49 E. 33rd St.), 1960. 688 pp. Price, $6.75.

Exchanges of written records "permit us to reach decisions, issue policies, recommend action, and record information" (Preface). Considering the amount and variety of effective communicating demanded of public health workers for these purposes, any practical treatise that will help them do this part of their job better should find its way to their library shelves. "Effective Report Writing" is such a treatise. And the fact that its emphasis is on report writing gives it added value to professional persons, called upon as they are so often to explain new technical information both to their colleagues and to laymen.

The book covers the field with detailed chapters on reports, business letters, other technical writing and oral presentations. It has been effectively designed for classroom and office, and could be used to advantage both as a reference by old hands at the business of communicating and, as a guide, by those entering the maze of technical writing as relative novices.

In his capacity of consultant to industry, Dr. Sigband has been able to obtain many examples of short-form operational reports from his clients for use in classroom or reader evaluation. This kind of material is not too frequently available, collected in one place and in print. Something unusual in books of this kind, too, is the section on sampling and sampling methods. To the biostatistician and research person this section of the book would be elementary, but many other readers would doubtless find that the definitions of various samples given are suited to their needs.

The author is chairman of the Department of English, College of Commerce, DePaul University, Chicago.

SURGERY AS A HUMAN EXPERIENCE: The Psycho-dynamics of Surgical Practice—By James L. Titchener and Maurice Levine. New York, N. Y.: Oxford University Press (417 Fifth Ave.), 1960. 285 pp. Price, $6.00.

This book appears to be primarily addressed to the nonpsychiatrically trained physician and it accomplishes the objective of providing a psychodynamic orientation which clarifies the meaning of surgery in an admirable manner. It is simply and concisely written, yet summarizes the basic publications about the patient's psychological experience associated with surgery.

From the viewpoint of a theoretical orientation different from that adopted by the authors, two significant limitations exist in their presentation. The first is the failure to stress that psychopathology emerging in the context of surgery is perhaps as much attributable to surgeon-patient transactions and the social structure of the hospital as it is to pre-existent beliefs and expectations on the part of the patient. Second, the specificity of the threats signified by serious illness and its treatment and the adaptive technics elaborated to cope with these highly significant specifics are perhaps not sufficiently emphasized.

Many sections of the volume should prove to be of considerable assistance to surgeons and internists in the understanding of their patients.

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

ABNORMAL PSYCHOLOGY — COLLEGE OUTLINE SERIES. MENTAL ILLNESS TYPES, CAUSES, AND TREATMENT. W. J. Coville, et al. New York, N. Y.: Barnes and Noble, 1960. 298 pp. Price, $1.75.

ACCENT ON LEARNING—AN ANALYTICAL HISTORY OF THE FUND FOR ADULT EDUCATION'S EXPERIMENTAL DISCUSSION PROJECT 1951-1959. Glen Burch. Chicago, Ill.: American Foundation for Continuing Education, 1960. 134 pp.

BASIC DOCUMENTS (11th ed.). Including amendments approved by the executive board at its 25th Session, 1960, and the 13th World Health Assembly, May, 1960. WHO Publication. New York, N. Y.: Columbia University Press, 1960. 188 pp. Price, $1.25.

CASEWORK PAPERS 1960. From the National Conference on Social Welfare presented at the 87th Annual Forum, Atlantic City, N. J., 1960. New York, N. Y.: Family Service Association of America, 1960. 154 pp. Price, $2.50.

CULTURE, SOCIETY, AND HEALTH. Dorothy L. Keur, et al. Annals of the New York Academy of Sciences, Vol. 84, Art. 17. New York, N. Y.: The Academy, 1960. pp. 783-1060. Price, $3.50.

DIE ROHSÄFTE-KUR (The raw juices treatment. Principles, method, therapeutic, results). Eugen Heun. Stuttgart, Germany: Hippokrates-Verlag, 1960. 286 pp. DM, 19.50.

DRUG ADDICTION. Dorothy Campbell Tompkins. Berkeley, Calif.: University of California, Bureau of Public Administration, 1960. 130 pp. Price, $3.00.

HOUSING CODES—THE KEY TO HOUSING CONSERVATION:

Volume 1—Background of Code Enforcement. 81 pp.

Volume 2—Model Housing Code Applicable to One-and Two-Family Dwellings, Multiple Dwellings, Mobile Homes and Mobile Home Courts. 59 pp.

Volume 3—Administrative Guide. 42 pp. New York, N. Y.: State of New York, Division of Housing, 1960.

HOUSING ENVIRONMENT AND FAMILY LIFE. A Longitudinal Study of the Effects of Housing on Morbidity and Mental Health. Daniel M. Wilner, et al. Los Angeles, Calif.: School of Public Health, University of California, 1960.

HUMAN NUTRITION HISTORIC AND SCIENTIFIC. Monograph III. Edited by Iago Galdston. New York, N. Y.: International Universities Press, 1961. 321 pp. Price, $6.00.

IMAGE OF THE CITY. Kevin Lynch. Cambridge, Mass.: Harvard University Press, 1960. 194 pp. Price, $5.50.

INTRODUCTION TO CELLULAR THERAPY. Paul Niehans. New York, N. Y.: Pageant Books, 1960. 119 pp. Price, $3.75.

JOBS AND SALARIES IN HEALTH AND WELFARE. Volumes I (163 pp.) and II (356 pp.). A report in two volumes of a job-evaluation project covering professional, clerical, and maintenance occupations in 96 member organizations of the Cleveland Welfare Federation. Cleveland, Ohio: Welfare Federation, 1960. Price, Set—$10.00.

MANUAL OF CARE FOR THE DISABLED PATIENT. Arthur J. Heather. New York, N. Y.: Macmillan, 1960. 119 pp. Price, $3.75.

MEDICAL AND BIOLOGICAL RESEARCH IN ISRAEL. Edited by Moshe Prywes. New York, N. Y.: Grune and Stratton, 1960. 562 pp. Price, $8.00.

MENTAL HEALTH EDUCATION: A CRITIQUE. Pennsylvania Mental Health, Inc.; American Psychiatric Association, and the National Association for Mental Health, Inc. Philadelphia, Pa.: Pennsylvania Mental Health, 1960. 180 pp.

NEW TRENDS IN NARCOTICS CONTROL. Leland M. Goodrich. New York, N. Y.: International Conciliation—Carnegie Endowment for International Peace, 1960. 242 pp.

NUTRITIONAL STATUS U.S.A. Agricultural Experiment Station Bulletin 769. Edited by Agnes Fay Morgan. Copies on request from the directors of most of the state Agricultural Experiment Stations, 1959. 130 pp.

PLANNING THE NEIGHBORHOOD. Vol. I of the 3-Vol. series of "Standards of Healthful Housing," 1960 edition. American Public Health Association, Committee on the Hygiene of Housing. Chicago, Ill.: Public Administration Service, and New York, N. Y.: American Public Health Association, 1960. 108 pp. Price, $3.00.

POSITIVE HEALTH OF OLDER PEOPLE. Based on discussions at the 1960 National Health Forum. New York, N. Y.: National Health Council, 1960. 131 pp. Price, $2.25.

PROCEEDINGS OF THE INTERNATIONAL CLEAN AIR CONFERENCE, LONDON, 1959. London,

England: National Society for Clean Air, 1960. 284 pp. Price, $4.75.

PSYCHOSOMATIC BEHAVIOR OF CHILDREN WITH CONGENITAL HEART DISEASE. PRE- AND POSTOPERATIVE STUDIES OF EIGHTY-FOUR CASES. B. Landtman, et al. Helsinki, Finland: Children's Hospital, University of Helsinki, 1960. 78 pp.

RESPIRATION—PHYSIOLOGIC PRINCIPLES AND THEIR CLINICAL APPLICATIONS. Peter C. Luchsinger and Kenneth M. Moser. St. Louis, Mo.: Mosby, 1960. 505 pp. Price, $15.75.

SCIENCE PROJECT HANDBOOK. Edited by Shirley Moore. Washington, D. C.: Science Service, 1960. 254 pp. Price, $.55.

SLEEP THERAPY IN THE NEUROSES. Translated from Russian. B. V. Andreev. The International Behavioral Sciences Series. Edited by Joseph Wortis. New York, N. Y.: Consultants Bureau Enterprises, 1960. 114 pp. Price, $8.50.

SOCIAL EPIDEMIOLOGY OF MENTAL DISORDERS. E. Gartly Jaco. New York, N. Y.: Russell Sage Foundation, 1960. 228 pp. Price, $3.50.

SUMMARY OF ACTIVITIES REPORTED BY LOCAL HEALTH COUNCILS, JUNE, 1960. National Health Council. New York, N. Y.: The Council, 1960. 43 pp. Price, $1.00.

TOXICOLOGY. Vol. I—MECHANISMS AND ANALYTICAL METHODS. Edited by C. P. Stewart and A. Stolman. New York, N. Y.: Academic Press, 1960. 774 pp. Price, $22.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Raymond S. Patterson, Ph.D., F.A.P.H.A.

Good News: Sanitary Engineering Var.—". . . the high level of enrollment in the various schools certainly indicates a healthy situation and an increased interest in the field of sanitary engineering and instruction."

ANON. Sanitary Engineering Degrees Awarded in 1959. Pub. Health Rep. 75,12:1146 (Dec.), 1960.

Bigger and Better (?)—Boys and girls in high school and college grow taller and heavier by the generation—reflecting better nutrition, advances in public health, generally higher living standards, and the earlier attainment of physical maturity. This you must know, but you may be glad to have the statistical bases for these conclusions.

ANON. Growth Trends in the Teen Ages. Statist. Bull. Metrop. Life Insur. Co. 41,10:3 (Oct. 1), 1960.

The Battle Goes On—". . . venereal disease can be cured promptly by medical treatment . . . but except (by) discouraging promiscuous sexual habits, the only way to prevent venereal infection today is to find and treat carriers of the germs." Though this is certainly not a new concept it is an emphatic reminder, and serves to introduce a half-dozen important discussions of what is really going on in the current control program—about which some of us may have only rather sketchy notions.

ANON. A Current Look at the Venereal Diseases. Pub. Health Rep. 75,11:989 (Nov.), 1960.

About Barrier Creams—Our industrial hygienists, especially, will find much of interest in this (Br.) discussion of the protective possibilities and potential hazards of barrier creams for workmen's hands. Says the writer: we should advocate their use only when we have soundly based proofs of their value. We cannot recommend them when the exact composition is not known. At present most are secret remedies.

BETTLEY, F. R. Some Dermatologic Hazards of Today. Brit. M. J. 5211:1468 (Nov. 19), 1960.

For "Delicate" Children — This paper would seem to be chiefly of interest to the insatiably curious. It is about open-air schools, of which there are 12 in London, England. They have been in operation for half a century and the questions raised here is: are they anachronisms? The survey suggests that there are still enough asthmatic children to justify these special educational provisions.

COPITHORNE, R. E. C., and PALMER, W. T. A Survey of Pupils from Schools for the Delicate in London. M. Officer 104,22:323 (Nov. 25), 1960.

Accident Days—More than half the group of regularly menstruating women who became involved in accidents—at home, on the road, or in factories—were so involved while they were menstruating, or immediately before. "One wonders," wonders the researcher, "if awareness by women that they are more accident-prone (at that time) would enable them to use greater care . . . or will it merely induce a menstrual neurosis?"

DALTON, K. Menstruation and Accidents. Brit. M. J. 5210:1425 (Nov. 12), 1960.

Something for Everybody—Here you will find usefully boiled down, most of the recommendations relating to school health (from among the 670 covering almost every phase of life and interest of children) emanating from the 1960 White House Conference. You may want to use some of these recommendations as a stimulus for the development of effective school (and community) health programs for your bailiwick in the coming years.

DUKELOW, D. A. 1960 White House Conference Recommendations on School Health. J. School Health 30,9:334 (Nov.), 1960.

Minor National Craze—The following quotation is from the boxed comment on a paper of immediate concern to municipal health officers: "Acrobatic tumbling on the Trampoline . . . recently has become a national sport. This report is based on five patients who suffered severe neurologic injuries . . . all but one of the injuries resulted from backward somersaults imperfectly executed. . . . Ten regulations for commercial Trampoline centers are suggested . . . (and) public health officials and local medical authorities are asked to take the initiative in the enforcement of these regulations."

ELLIS, W. G., et al. The Trampoline and Serious Neurological Injuries. J.A.M.A. 174, 13:1673 (Nov. 26), 1960.

"State of Much Confusion"—These words are from the concluding sentence of a leading review article on coronary artery disease and seem to epitomize this distinguished author's over-all view of this disputatious subject. Earlier, he comments, "I should still say that, on the whole, the observations do not carry complete conviction that an increased level of blood lipids is the primary cause of atherosclerosis, though it may well be important in the development of lesions."

FLOREY, H. Coronary Artery Disease. Brit. M. J. 5209:1329 (Nov. 3), 1960.

Public Affairs—Just in case the paper's title (below) catches your eye, it is not about doctors in public service. It deals with the reactions of practicing

physicians to political appeals and problems—such as the likelihood of accepting public office, participation in election campaigns, and their partisan opinions. You will not be much surprised at the finding that, in general, they seem to share the conservative values of "other American social elites."

GLASER, W. A. Doctors and Politics. Am. J. Sociol. 66,3:330 (Nov.), 1960.

Preventive Geriatrics—Fifteen people who are doing something about the care of the aged tell about many facets of the geriatric services. These stimulating papers look into preventive measures as well as the matters of providing care for the aged sick and destitute. The art of living, said the ancient Greeks, consists in dying young—but as late as possible. A pretty good motto for our modern day efforts, don't you think?

HUNT, G. H., et al. Recent Advances in Geriatrics. Pub. Health Rep. 75,12:110 (Dec.), 1960.

Who Is Healthy Now?—During the time of a nine-month study, ten "healthy" and dedicated New Yorkers "had the misery" more than half the time without much disruption in their work attendance. One worker's symptoms—headache, myalgia, loss of appetite—though severe resulted in only one day's absence. They averaged seven discrete minor illnesses per person, mostly respiratory, though defying etiologic classification. Absenteeism must be an unreliable guide to disease incidence in a highly motivated group!

MCNAMARA, M. J., et al. Minor Respiratory Disease in Ten "Healthy" Adults. Am. Rev. Resp. Dis. 82,4:469 (Oct.), 1960.

Polio Prophylaxis Again — This Vanderbilt University study of paralytic polio cases in a community epidemic comes to the conclusion that paralytic cases sometimes do occur in completely vaccinated patients, that the degree of paralysis may be comparable to that in the unvaccinated, and that the available commercially prepared vaccines given in presently acceptable schedules do not necessarily prevent significant paralysis.

MERRILL, R. E., et al. Vaccination Status of Patients in an Outbreak of Acute Poliomyelitis. A.M.A. Am. J. Dis. Child. 100,6:857 (Dec.), 1960.

More About Hard Water—Further inquiry by states into the relationships between hardness of water and death rates from the leading causes of death in age group 55 to 64 suggests that the hardness or softness of drinking water may influence death rates from hypertension and atherosclerosis.

SCHROEDER, H. A. Relations Between Hardness of Water and Death Rates from Certain Chronic and Degenerative Diseases in the United States. J. Chronic Dis. 12,6:586 (Dec.), 1960.

And Chest X-Rays—This is the conclusion of a study of tuberculosis screenings in three broad age groups: "Since the prevalence of tuberculosis infection is so low in the (under 15) age group and since the genetic effect of ionizing radiation may be of importance to young people, consideration should be given to discontinuing roentgenographic screening of (them) . . . and limiting such methods to groups of older people where it is known or suspected that tuberculosis is more prominent."

SCHULTZ, H. H. Tuberculosis Case-Finding Among Young People. New York J. Med. 60,23:3816 (Dec. 1), 1960.

They Wanted Help — Brooklyn (N. Y.) experimented with a telephone-answering service to tell inquirers where they might get help for suspected mental or emotional disorders. About 110 inquiries a month were received, the majority of calls being concerned with children and adults under 40. A follow-

up call to a sampling of cases, a year after the initial request, indicates that about three of each four did apply for help at the referred source. Others went elsewhere. Altogether seven of every eight adults and four of every five children reported some treatment. You will find interesting break-downs of requests and dispositions.

SIMON, M., et al. Inquiries to a Mental Health Association Concerning Treatment Facilities. Milbank Mem. Fund Quart. 38,4:301 (Oct.), 1960.

If additional information is desired regarding the articles listed in this bibliography, please communicate directly with the publications in which they appeared; the addresses are furnished for your convenience.

A.M.A. Am. J. Dis. Child. (American Journal of Diseases of Children), American Medical Association, 535 North Dearborn St., Chicago, Ill.

Am. J. Sociol. (American Journal of Sociology), University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Ill.

Am. Rev. Resp. Dis. (American Review of Respiratory Diseases), National Tuberculosis Association, 1790 Broadway, New York 19, N. Y.

Brit. M. J. (British Medical Journal), British Medical Association House, 19 Tavistock Sq., London, W.C.1, England.

J.A.M.A. (Journal of the American Medical Association), 535 North Dearborn St., Chicago, Ill.

J. Chronic Dis. (Journal of Chronic Diseases), C. V. Mosby, 3207 Washington Blvd., St. Louis, Mo.

J. School Health (The Journal of School Health), American School Health Association, 515 East Main Street, Kent, Ohio.

M. Officer (Medical Officer), Chronicle House, 72-78 Fleet St., London, E.C.4, England.

Milbank Mem. Fund Quart. (Milbank Memorial Fund Quarterly), 40 Wall St., New York, N. Y.

New York J. Med. (New York State Journal of Medicine), 750 Third Ave., New York, N. Y.

Pub. Health Rep. (Public Health Reports), Government Printing Office, Washington, D. C.

Statist. Bull. Metrop. Life Insur. Co. (Statistical Bulletin of the Metropolitan Life Insurance Company), 1 Madison Ave., New York 10, N. Y.

CREDIT LINES

The Journal cannot furnish copies of items mentioned in Credit Lines. Please send requests to addresses given.

International Health: Cancer, Congo

"Cancer Mortality for Selected Sites in 24 Countries (1950-1957)" is the work of Mitsuo Segi, M.D., et al., on the faculty at the Department of Public Health, Tohoku University School of Medicine, Sendai, Japan. The information for this 277 page hard-cover volume was furnished by the central statistics administrations of the cooperating countries. All continents are represented. Mortality data by age group and sex in each of the three parts (I, number of deaths; II, death rates; III, age-adjusted death rates) are related to more than a dozen neoplastic sites. The Japanese Cancer Society and the Nihon Life Insurance Mutual Company financed the publication (July, 1960), and it may be available through the authors in limited supply.

"Republic of the Congo: A Study of Health Problems and Resources" was begun by staff of the Division of International Health, Public Health Service, before the Belgian Congo became independent in 1960.

The PHS has taken the mass of information "readily available" from sources given in the bibliography, organized it into 115 concisely phrased pages and given it a form considered more readily accessible to the user. Readers are told that the information contained is "only as up to date as . . . sources permit it to be," but will find the compilation serviceable on several other counts. Introductory chapters on the country and its people, for example, are most informative and may help counteract some incorrect impressions.

(For a picture story of the Congolese in their peacetime pursuits and of WHO operations there, see WHO's World Health for November-December, 1960. Columbia University Press, 2960 Broadway, New York 27, N. Y.)

Credit is given Jane H. Priest of the division for her major contributions to the report. PHS Publication No. 806, U. S. Government Printing Office, Washington, D. C. 75 cents.

Issues of Conscience Examined

A report of Dartmouth College's convocation on Medicine and Issues of the Conscience appears in the November, 1960, issue of Federation Bulletin. The conference celebrated the opening of Dartmouth's new medical science building, a headquarters for the college's two-year program of academic preparation for clinical study.

An international — British, Indian, Canadian, and American — panel explored the issues. Their cues for discussions were the "oneness of all learning as a liberating force from meanness of mere existence, the wretchedness of unnecessary suffering, and the folly to which any 'little learning,' standing alone, leads men"—words of Dartmouth's President Dickey. Dr. Rene Dubos, keynote speaker and convocation chairman, singled out environmental health, atomic energy waste products, and food additives for the significance they would have on many great decisions in the future.

This brief report of a three-day meeting (September 8-10, 1960) is masterful in the extent to which it covers the discussions. The bulletin is published

monthly by the Federation of State Medical Boards of the United States, 1201-05 Bluff St., Fulton, Mo. Single copies 50 cents. Editor—and reporter on the convocation—is Stiles D. Ezell, M.D.

What Every Expectant Mother Needs

The California State Department of Public Health has recently published "Standards and Recommendations for Public Prenatal Care." It presents the joint policy adopted by the department and the state's Conference of Local Health Officers. In sum the state's policy is that every eligible expectant mother needs thorough medical supervision throughout her pregnancy, and dietary supervision based on her individual requirements. She and her family need to know about the changes which occur in her during pregnancy, the care she needs, the preparations necessary for her delivery, and the care of her new born infant. Detailed recommendations for putting this policy into effect are given in the 18-page text along with discussions of the functions and responsibilities of professional staff, administrative aspects, and necessary facilities. This and a 39-page supplementary handbook for professional use entitled "Nutrition During Pregnancy and Lactation" are available to professional health workers upon request to California State Department of Public Health, 2151 Berkeley Way, Berkeley 4, Calif.

Readings In Mental Health

"You are about to read a non-technical summary of the Mental Health Survey of Los Angeles County." So reads the preface to "Los Angeles County Surveys Its Mental Health Services." The survey was made through a commission established by the Welfare Planning Council, Los Angeles Region. The commission's human approach and some of the questions it got answered are best expressed in its own words: "What care and treatment does the Los Angeles community provide for those who are mentally ill? Is it what they need? Is it enough? Is it available to those who need it—in terms of time, place, money? Do they or their families or those to whom they turn for help know what is available? Could a better job be done for more people? Is it worth doing?"

The summary, 62 pages, $1.08, is available through the Council, 733½ Hope St., Los Angeles 17, Calif. The complete survey, 576 pages, $5.20 accompanying order, postage probably extra, may be had through Documents Section, State Printing Division, Sacramento 14, Calif.

"New Developments in Community Mental Health," is the title of the proceedings of a Technical Assistance Conference (Lenox, Mass., November 2-4, 1959) underwritten by the National Institute of Mental Health with the South Shore Mental Health Association and the Massachusetts Department of Mental Health as co-sponsors.

Conference participants reexamined the relationship between community clinics and hospitals. Ernest M. Gruenberg, M.D., delivered the title paper. Luther E. Woodward, Ph.D., spoke about the initiation and development of a community program. Louisa P. Howe, Ph.D., discussed evaluation of programed activities. George W. Goethals, Ed.D., described the school's role in mental health. Their papers, the discussions they provide, and summaries of group sessions fill 88 pages. Available free from Division of Mental Hygiene, Massachusetts Department of Mental Health, 15 Ashburton Place, Boston 8.

The Southern Regional Education Board founded its mental health program in 1954 "on the assumption that

leverage must be applied to training and research if the South's mental health were to be raised to higher levels." In 1957, SREB charged a panel of research experts "to think creatively about the promotion of research. . . ." The panel prescribed a course of action which is described in "Mental Health Research in the South on the Threshold of the 60's: Report of a Survey and Workshop" sponsored by SREB. The survey ran from March to November, 1959, questionnaires being returned from 636 respondents—investigators and administrators of research—in 16 states. The workshop was a follow-up to the survey.

This 71 page paperback describes many of the "practical answers to practical questions" found through the survey and recreates proceedings at the workshop. SREB brings the publication to a close with a "second look" in which it singles out "decisive issues which . . . decision-makers will face" in states which follow the recommendations of the workshop. For information on availability write SREB, 130 South St., N.W., Atlanta 13, Ga.

Papers on Retardation Published

"Proceedings of Institute for Nurses on Mental Retardation" takes up the entire September, 1960, issue of Public Health News, the monthly publication of the New Jersey State Department of Health (129 East Hanover St., Trenton 25). The articles included indicate the wide reader appeal of this collection: "The Problem of Mental Retardation," by Rudolf Hormuth; "Medical Aspects of Mental Retardation," by Margaret Giannini, M.D.; "Social and Cultural Aspects of Mental Retardation," by Edward Wellin, Ph.D.; "Handicapped Child and His Concept of Self," by Harry V. Bice, Ph.D.; "Parents' Viewpoint," by Elizabeth W. Boggs, Ph.D.; "Home Training," by Laura L. Dittman; "Public Health Nurse and the Mentally Retarded Child," by Gertrude Johnson, R.N.; and other articles on New Jersey state programs.

"Outlook for the Adult Retarded" (Proceedings of the 35th Spring Conference of the Woods Schools) includes papers on institutional and noninstitutional aspects, and on health, welfare, vocational, legislative, and attitudinal problems related to the adult retarded.

As a result of the reduction of incidence of acute infectious diseases and the increase in number, type, and scope of programs dealing with retarded children, more retarded individuals live longer and healthier lives. Today, the greatest emphasis in the field of mental retardation has been on children; this conference signaled a bellwether effort to come to grips with the fact that more retarded children are growing up.

The conference was held in cooperation with the Massachusetts Special Commission on Retarded Children, Boston, May 6-7, 1960. Published by The Woods Schools (for Exceptional Children), Langhorne, Pa., 123 pages; $1.

To Self-Insure or Not?

Foundation on Employee Health, Medical Care and Welfare, Inc., has now issued Part D of its study on problems and solutions of health and welfare programs. Entitled "Pros and Cons of Insurance and Self-Insurance of Health and Welfare Benefits," it discusses the insurance of cash-indemnity benefits. The provision of benefits is examined under the light of how an insured indemnity program operates, what functions are carried out by the insurance company, what is involved in doing the same via self-insurance, and how to determine, then compare, the costs of these functions. One dollar from the foundation which is officed at 477 Madison Ave., New York 22,

N. Y. (Part A of the study is called "Improving Value and Reducing Costs"; Parts B and C, "Service Benefits—and How to Compare Service Benefits vs Indemnity Benefits." Part D concludes the series. The foundation is co-sponsored by U. S. Industries, Inc. and the International Association of Machinists.)

Worth Acquiring

"Highlights of the Fifth International Congress on Nutrition" (held September 1-7, 1960, Washington, D. C.) is now available in the November-December, 1960, issue of Borden's Review of Nutrition Research. Author is W. A. Krebl, M.D., Ph.D. Copies on request from the Review's offices at 350 Madison Ave., New York 17, N. Y.

"The Nurse: Her Role in Eye Health" is divided into five sections, one each for institutional, student, public health, school, and occupational health nurses. It comes as a 12-page refresher guide to the nurse in a day when, with an increased life span, glaucoma, cataracts, and other eye diseases are more frequent, but often preventable. National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N. Y. Publication No. 137, 10 cents.

For local consumption but worthy of being considered for imitation elsewhere is "The Health Education Look-Book" published by the Health Education Council, Public Health Federation, Cincinnati, Ohio. It is a 16-page mimeographed directory put together to help teachers, nurses, discussion leaders, social workers, physicians, program chairmen, educators themselves, and others find the local, state, and national organizations which offer free or inexpensive health education services. Commendable advice on the first page is that one of "Several ways to keep up with new knowledge in the health . . . fields" is to "join one of the organizations of educators such as the Health Education Section or the School Health Section of the American Public Health Association," etc. Also, for the novice in health education: authentic, attention-getting, and consistent health information is usually not enough to motivate people. "Build your . . . program around people, their social groups, their needs and interests." Send 10 cents to the federation at 312 West Ninth St., Cincinnati 2, Ohio.

"More Than Fun" is a handbook of recreational programing for children and adults with cerebral palsy. Sylvia B. O'Brien of United Cerebral Palsy of New York City is the author. This well illustrated 38-page booklet includes sections on: the values of the program, how it should be organized, whom it should serve, qualifications for those leading it, and a bibliography. The manual was planned by the Recreational Activities Committee of United Cerebral Palsy Associations, Inc., which publishes it. First copy free from UCPA, 321 West 44th St., New York 36, N. Y. Up to 99 copies, 20 cents each. (UCPA has also cooperated with the Public Affairs Committee in the publication of Jules Saltman's "Meeting the Challenge of Cerebral Palsy," which would appear to be a most useful educational tool. Public Affairs Pamphlet No. 158B, 22 East 38th St., New York 16, N. Y. 25 cents.)

NEWS FROM THE FIELD

Pan-American Cooperation: Research

In December, 1960, the Pan American Health Organization and the U. S. Public Health Service issued a "statement of arrangements" which are intended to further collaboration between the two staffs and to promote the development of PAHO research activities.

Under the agreement the PAHO will provide moderate financial support to certain research programs, conduct studies on its own, and help coordinate study projects involving more than one country. The PHS will give technical advice on research design, and consider grant proposals from investigators who wish to work in programs either coordinated or conducted by PAHO. Within the PHS, responsibility for the program is delegated to the Office of International Research Activities at the National Institutes of Health.

International Conferences Planned

The Eighth International Congress for Microbiology will meet in Montreal, Canada, August 19-25, 1962, under the auspices of the Canadian Society of Microbiologists. Two or more symposia are being planned for each of five sections: Structure and Function, Agricultural Microbiology, Industrial Microbiology, Medical and Veterinary Microbiology, and Virology. Complete details from Dr. N. E. Gibbons, VIII International Congress for Microbiology, National Research Council, Ottawa 2, Canada.

The University of Miami School of Medicine will sponsor the Third Inter-American Conference on Occupational Medicine and Toxicology, to be held in Miami, August 6-10, 1961. The 1961 conference will be bilingual, in contrast to the 1956 and 1958 meetings which were conducted entirely in Spanish. Included among the papers to be given are those based on recent research in temperature stress, drug action, dermatology, noise, radiation, medicine as practiced in the tropics, heavy metals, pesticides, and fungicides. Further information on registration and program from Dr. William B. Deichmann, Chairman, Department of Pharmacology, University of Miami School of Medicine, Coral Gables, Fla.

"Living Conditions, Health and Economic Development" is the title of the Third International Conference of the International Medical Association for the Study of Living Conditions and Health. This will convene September 29-October 1, 1961, in St. Vincent, Aosta Valley (near Turin), Italy. The program will be divided between discussions of public health as a factor in economic development and the influence of economic development on health. Further information from: General Secretary, International Medical Association for the Study of Living Conditions and Health, Burggasse 71/I/6, Vienna 7, Austria.

Smog: Local Control, Nation's Goals

The Air Pollution Foundation was organized by civic leaders in 1953 to determine the nature of Southern California smog and the best methods for eliminating it. Set up as a private nonprofit research organization, it was to be self-liquidating upon accomplishment of its mission. It plans to disband in May, 1961, donating its remaining assets to the California Institute of Technology.

The foundation has raised and spent some $3.5 million for research, findings from which have been shared with governmental units, universities, and voluntary agencies concerned with the problem. According to the announcement of its dissolution the foundation's studies have presented final conclusive proof that auto exhaust is the major factor in Los Angeles Smog. And since "the State of California has now embarked upon (auto exhaust) control, the end of the 20-year smog siege is now in sight."

(Another report from the area, this time courtesy of the Los Angeles County Air Pollution Control District, bodes better for Los Angeles than for three other industrial cities in the United States with which it was compared. According to the survey of a consulting engineer, the average dustfall—amount of solid material settling out of the air—during 1959 in the four cities, expressed in tons per square mile per month, was Los Angeles, 28.9; Chicago, 48.7; Philadelphia, 60.3; and New York, 70.6.)

In December, 1960, the Public Health Service released "National Goals in Air Pollution Research," the report of the Surgeon General's ad hoc task group which was appointed in November, 1958.

The task group says ten goals should be realized within the new decade. For example, the nation must: determine effects on agricultural economy; seek better ways of measuring and identifying air pollutants at their source; expand monitoring efforts; evaluate legal practices related to air pollution control. Expenditure for research along these lines should be steadily increased from the present estimated level of $11 million annually to $32 million by 1968. The group recommends that 40 per cent of the cost be assumed by the federal government, 28 per cent by industry, and 32 per cent by state and local governments.

At the time of publication single copies of the report (PHS Publication No. 804, 40 pages) were available through the Press Room, U. S. Department of Health, Education, and Welfare, Washington, D. C.

Safety Research Project Honored

The first Metropolitan Life Award for Research in Accident Prevention has been presented to Dr. B. J. Campbell, now assistant to the director of the Automotive Crash Injury Research Project at Cornell University, for his study "Driver Improvement: The Point System." The project was conducted at the University of North Carolina, sponsored by the American Association of Motor Vehicle Administrators, and financed by the Esso Safety Foundation. The award, for $1,000, is administered by the National Safety Council.

Medical Care cum Social Research

The Medical Care Research Center, established in 1960 as a joint enterprise of the Social Science Institute of Washington University and Jewish Hospital, St. Louis, has received a five-year grant from the Public Health Service. The center will support cooperative efforts by medical care administrators and social scientists in studies of the organization and administration of health services in the general hospital and the community. Co-investigators in the research program are David Littauer, M.D., executive director of the hospital, and Nicholas J. Demerath, Ph.D., director of the institute.

Local Resources Meshed: Home Care

In 1956 the Hartford (Conn.) Health Department was instrumental in focus-

ing the attention of several agencies in the city on community needs for comprehensive medical care in the home. The result was a home care program in which the following organizations actively take part: Greater Hartford Community Council, the county medical society, Hartford Rehabilitation Center, the VNA, Family Service Society, the city's four general hospitals, Greater Hartford Tuberculosis and Health Association, and the Connecticut Chapter of the Arthritis and Rheumatism Foundation.

Original funding for the program came from the Hartford Foundation for Public Giving and the Connecticut State Department of Health. A report (October, 1960) from Regions I and II of the Public Health Service, describes the program and notes that "there appear to be good prospects that funds can be obtained to extend and expand" it.

The coordinator of the program, a physician in the health department, determines policy guided by a medical advisory committee. The health department also provides a nurse administrator and two physical therapists. Home nursing is done by the VNA, and the rehabilitation center provides services of occupational and speech therapy. Social casework is furnished and homemakers secured through the Family Service Society.

The attending physician determines a patient's eligibility for service. He does this through a home visit, basing his decision on a patient's medical need. Services are available to all regardless of ability to pay. Those able to pay do so on a sliding scale.

(Source of the above information is a folio entitled "Interesting Program Activities of Local Health Departments, Regions I and II" of the Public Health Service, with offices at 42 Broadway, New York 4, N. Y. Illustrates some new approaches and "examples of excellent work being done in old and more basic program areas" that may be worthy of emulation.)

Committee on Aging Now Council

The National Council on the Aging which came into existence on January 1, grew out of the National Committee on the Aging, a standing committee of the National Social Welfare Assembly since 1950. Although no longer under NSWA's auspices, the council will be one of its affiliates.

The council will serve as a central, national resource for planning and consultation about older persons. Its members will include representatives of business and industry, organized labor, government, the health professions, education, housing, research, the clergy, social work, and local communities. Council president is G. Warfield Hobbs; the NCA office is at 345 East 46th St., New York 17, N. Y.

Attention Veterinarians and Nurses

"The need for veterinarians in the field of laboratory animal medicine far exceeds the supply of trained people. This has been due to the fact that no institution has offered advanced training to graduate veterinarians in this specialty." So reads a course-description from the Vivarium of the Bowman Gray School of Medicine of Wake Forest College, which has designed a graduate program to help fill the educational gap.

Candidates must be graduates of an accredited school holding the degree of Doctor of Veterinary Medicine. During their two-year program students will rotate through five departments of the medical school. Emphasis will be placed on those disciplines in which veterinary medical assistance is frequently needed.

Stipends are $4,500 the first year and $5,000 the second, under certain conditions possibly tax free. Other moneys are available for research expenditures and for attendance at national scientific meetings and visits to other medical

research institutions. Further details from Thomas B. Clarkson, D.V.M., Director of the Vivarium, Bowman Gray School of Medicine, Wake Forest College, Winston-Salem, N. C.

The University of Minnesota School of Public Health will hold a work conference May 8-12, on the Role of the Public Health Nursing Faculty Member in a Field Agency. The school hopes to attract pairs of applicants: one from a nursing school faculty and one from the cooperating field agency where baccalaureate nursing students are placed for clinical practice. Representatives of school-agency programs about to be initiated are encouraged to attend. Students will review current trends in nursing education and look into new methods of providing public health nursing clinical experience. The course will also deal with the cost factors of interlocking programs. Further information from Director, Center for Continuation Study, University of Minnesota, Minneapolis 14, Minn.

Health Department Law Upheld

The Montana Supreme Court issued its decision in August, 1960, on the action brought to test the constitutionality of the state law which provides for two or more counties to combine in forming a health department.

The court considered three main questions: (1) whether the sections of this law, which allow the creation of these departments as a quasi-political subdivision of the state without the control of county commissioners of one or either of the counties, were in violation of the state Constitution; (2) whether the Constitution was violated in the actions which provide for the assessement of taxes for the operation of these departments; (3) whether Montana statutes are violated when the power to make rules and regulations that carry criminal penalities is delegated by the legislature to a board.

The court stated that such a department is not a quasi-political subdivision but at most could only be defined as a department of state or an agency of the executive branch of the state government. Furthermore, it is only a provision for an effective method of cooperation among the counties of Montana with respect to health problems.

The court also declared the law to be constitutional and not deemed a taking of property without due process since other Montana statutes provide for sufficient notice and hearing for the general tax authorized in this law.

The delegation to a board of the power to make rules and regulations that carry criminal penalties is of no consequence, the court stated, since the legislature has provided penalties in the law, and the board is without the power to prescribe what the penalties will be.

The court's opinion was that the plaintiff had one valid argument, however, in that, when the legislature fails to prescribe with reasonable clarity, the limits of power delegated to an administrative agency, or if those limits are too broad, its attempt to delegate is a nullity. The court suggested that the law be amended to include references to the statutes providing existing duties and powers of the State Board of Health.

Hospitals with Osteopaths Listed

Thirteen hospitals with both doctors of medicine and doctors of osteopathy on their staffs have been listed by the American Hospital Association since September, 1959. At that time the AHA changed its requirements to permit listing of hospitals where osteopaths may join the staff provided they work under medical supervision. Twelve more such hospitals are waiting to be surveyed by AHA. Another 37 have applied.

The AHA listing program, which

basically provides a census of institutions which can be classified properly as hospitals, is to be distinguished from the program of the Joint Commission on the Accrediation of Hospitals. The latter, made up of four organizations including the AHA, is concerned with minimum standards of hospital operation.

Resocialization After Therapy

The Veterans Administration reports that the number of mental patients whom its hospitals have placed on trial visit to their home communities and to foster homes has increased steadily since 1953. The 17,330 patients so placed during fiscal 1960 is more than double the 7,617 placed in fiscal 1953. Nearly all the patients leaving on trial visits have been treated for severe mental conditions, the VA said.

VA attributes this increase in part to its hospitals' efforts to help patients develop new habits of resocialization in preparation for return to community living, and to the growth of VA programs in cooperation with community resources which help patients find suitable homes and jobs on release from the hospital.

PERSONALS

A. Josephine Brown, M.P.H.,† formerly nursing director, Calhoun County Health Department (Mich.), is now assistant professor, University of Michigan School of Nursing, Ann Arbor.

Edna P. Coburn,† formerly assistant maternal and child health nursing consultant, Denver Visiting Nurse Service, is now assistant professor of nursing, University of Colorado School of Nursing, Boulder.

Stuart C. Fisher, M.P.H.,* formerly director of personnel and training, Texas State Department of Health, is now assistant director, Management and Personnel Services, Board for Texas State Hospitals and Special Schools, Austin.

Edmund C. Garthe, M.P.H.,† formerly regional engineer, Region VIII, Public Health Service, Denver, is now assistant director, Bureau of Environmental Health, Kentucky State Department of Health, Frankfort.

Marie F. Gately, M.P.H.,† formerly director of public health education, Boston Health Department, is now director, Division of Health Information, Massachusetts Department of Public Health, Boston.

Kenneth Gilman,† formerly city sanitarian, Newton, Kans., is now sanitarian, District No. 5 (Salina), Kansas State Board of Health.

Ralph C. Graber,* formerly chief, Air Pollution Engineering Branch, Division of Engineering Services, is now assistant chief of the newly formed Division of Air Pollution, Bureau of State Services, Public Health Service, Washington, D. C.

Betty Gwaltney,† formerly with the Health Careers Program, National Health Council, is now educational director of the new school of nursing, Richmond (Va.) Memorial Hospital.

Elizabeth F. Harlin, R.N.,† formerly advisory nurse, Page County Health Department, Va., is now director, Bureau of Public Health Nursing, Virginia Department of Health, Richmond.

Eleanor M. King, M.P.H.,† formerly dean, College of Nursing, University of New Mexico, is now assistant professor of nursing and assistant to the dean, University of Michigan School of Nursing, Ann Arbor.

Eva Landsberg-Lewin, M.D., M.P.H.,* recently with the Food and Agricultural Organization in Rome, is visiting professor of maternal and child health (1960-1961), Graduate School of Public Health, University of Pittsburgh.

F. Douglas Lawrason, M.D., formerly dean, University of Arkansas Medical School, is now executive medical director, Merck & Co., Inc., Rahway, N. J.

Dale R. Lindsay, Ph.D.,* formerly assistant chief, is now chief, Division of Research Grants, National Institutes of Health, Bethesda, Md. Deputy chief is Clinton C. Powell, M.D.,† formerly assistant grants branch chief for clinical research in the division.

Kenneth I. E. Macleod, M.D., M.P.M.,* formerly commissioner of public health, Worcester, Mass., is now commissioner of health, Cincinnati, Ohio.

Raymond G. McCarthy,† formerly associate professor of health education, Department of Public Health, Yale School of Medicine, is now director, Division of Alcoholism, Massachusetts Department of Public Health, Boston.

* Fellow.
† Member.

J. W. R. NORTON, M.D., M.P.H.,* secretary and state health director, North Carolina State Board of Health, was the recipient of the 1960 McCormack Award of the Association of State and Territorial Health Officers.

ANNA M. OBERT,† formerly advisor in public health education, International Cooperation Administration, Colombia, South America, is now health educator, Indian Health Area Office, PHS, Oklahoma City, Okla.

ERIC OLDBERG, M.D., head of the Department of Neurology and Neurological Surgery, University of Illinois Medical School, has been appointed president, Chicago Board of Health.

NEVIN S. SCRIMSHAW, M.D., Ph.D.,* formerly director, Institute of Nutrition of Central America and Panama (INCAP), is now director, Department of Nutrition, Massachusetts Institute of Technology, Cambridge.

JEANNETTE SIMMONS, M.P.H.,* formerly assistant chief, Health Education Branch, Division of Indian Health, PHS, is now director of school health, American Heart Association, New York, N. Y.

CLARA E. VAMBERY, M.D.,† formerly director, of maternal and child health, Long Beach (Calif.) Health Department, is now medical officer, Bureau of Crippled Children Services, California State Department of Public Health, Los Angeles Office.

MARTHA VAN METER,† formerly health education consultant, Indiana State Board of Health, is now health education consultant, Lexington-Fayette County Board of Health, Lexington, Ky.

GEORGE M. WHEATLEY, M.D., M.P.H.,* third vice-president, and director, Health and Welfare Division, Metropolitan Life Insurance Co., New York City, has been elected president, American Academy of Pediatrics.

DAVID P. WILLIS, M.P.H.,† a Milbank Memorial Fund Fellow in 1959-1960, is now research associate, Hospital Planning Association of Allegheny County, Pittsburgh, Pa.

DEATHS

EDWARD S. GODFREY, JR., M.D.,* New York State health commissioner from 1936 to 1947, and president of the American Public Health Association in 1940 on December 13, 1960 (Health Officers Section).

OCTAVE ROY, M.D., D.P.H.,† associate, Institute of Microbiology and Hygiene, University of Montreal, Montreal, Quebec, Canada (Epidemiology Section).

* Fellow.
† Member.

CONFERENCES AND DATES

American Public Health Association. Eighty-Ninth Annual Meeting, Detroit, Mich. November 13-17, 1961

State and Regional Public Health Meetings—February, March, and April, 1961:

Alabama Public Health Association. Hotel Admiral Semmes, Mobile. March 16-17.

Illinois Public Health Association with Middle States Public Health Association. Morrison Hotel, Chicago. April 12-14.

Kansas Public Health Association. Town House Hotel, Kansas City. April 3-5.

Kentucky Public Health Association. Kentucky Hotel, Louisville. April 11.

Middle States Public Health Association with Illinois Public Health Association. Morrison Hotel, Chicago. April 12-14.

North Dakota Public Health Association. Memorial Building, Jamestown. April 24-25.

Oklahoma Public Health Association. Hotel Tulsa, Tulsa. March 8-10.

Texas Public Health Association. Texas Hotel, Fort Worth. March 5-8.

Meetings of Other Organizations:

American Academy of Pediatrics (Spring Session). Washington, D. C. April 10-12.

American Association of Industrial Nurses. Dallas, Tex. April 25-27.

American College of Nurse-Midwifery. Sheraton-Gibson Hotel, Cincinnati, Ohio. April 7-8.

American Orthopsychiatric Association. New York, N. Y. March 23-25.

American Pharmaceutical Association. Conrad Hilton Hotel, Chicago, Ill. Week of April 16.

Child Study Association of America. New York, N. Y. April 10.

Council on Social Work Education. Montreal, Canada. February 1-4.

Groves Family Conference. Merrill-Palmer Institute, Detroit, Mich. April 10-12.

National Dairy Council. Louisville, Ky. February 7-9.

National Health Forum. Waldorf Astoria Hotel, New York, N. Y. March 13-16.

National League for Nursing Convention. Cleveland, Ohio. April 10-14.

National Social Welfare Assembly (Spring Meeting). New York, N. Y. April 18.

Royal Society of Health Congress. Blackpool, England. April 24-28.

Southwestern Conference on Diseases in Nature Transmissible to Man. Memorial Student Center, Agricultural and Mechanical College of Texas, College Station, Tex. April 27-28.

Venereal Disease Symposium, Twelfth Annual. Hotel New Yorker, New York, N. Y. April 13-14.

University of Oslo International Summer School offers second time: MEDICAL CARE AND PUBLIC HEALTH SERVICES IN NORWAY. (Registration limited) July 1-28, 1961 in Oslo, Norway. Two weeks of lectures and local visits in Norway; 14-day field trip. Write: Oslo International Summer School, Northfield, Minnesota.

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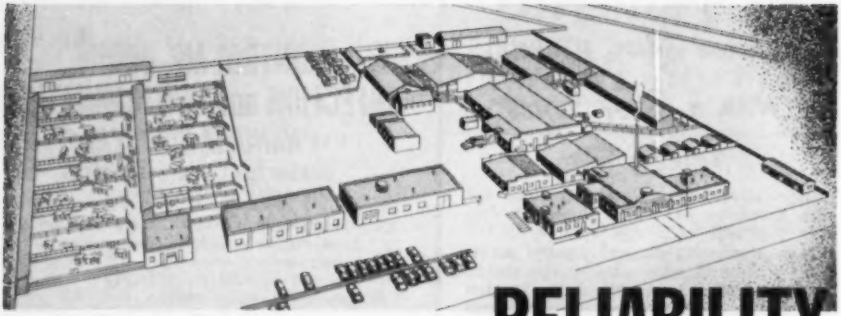

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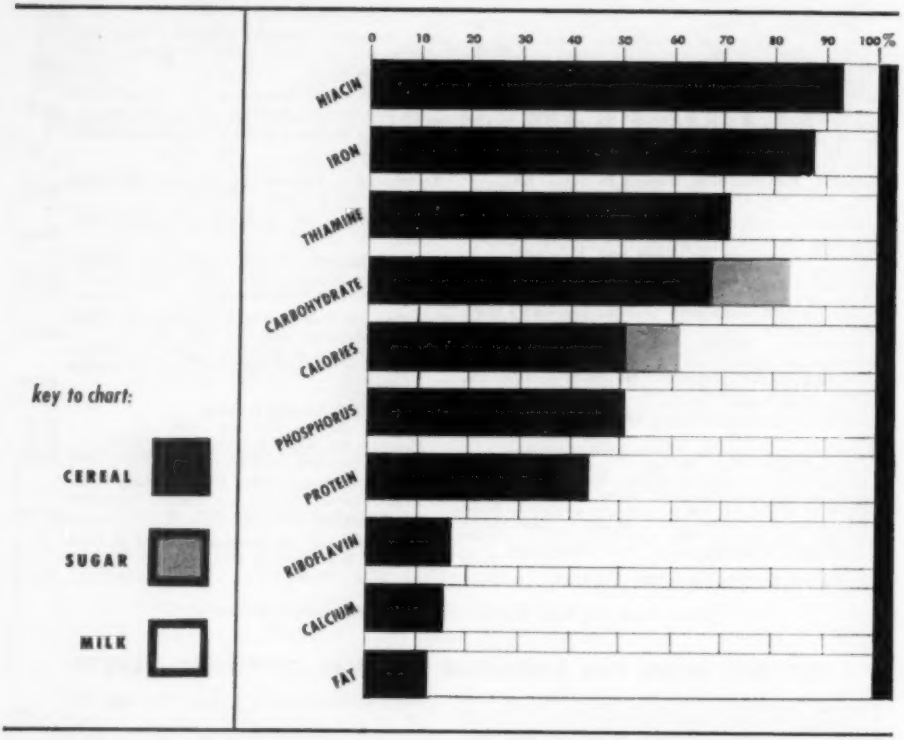

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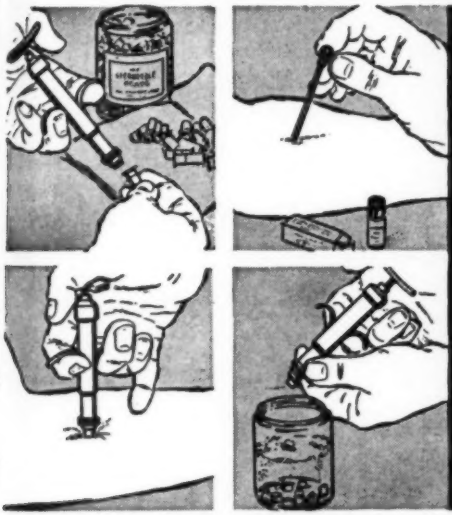
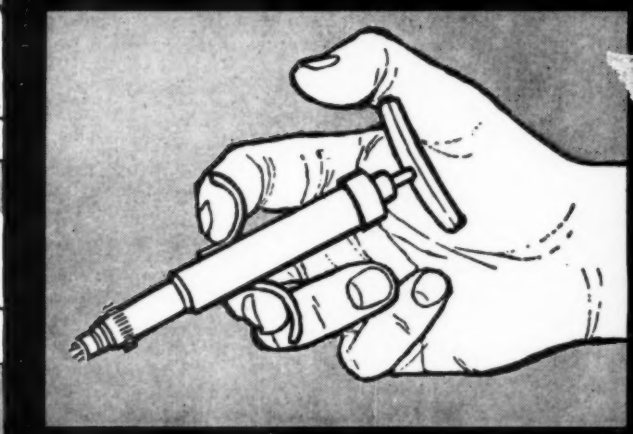
- **Faster and more reliable than Patch test.**
- **Performs up to 400 tests per hour.**
- **Detects reactors to 5 TU Mantoux and some 100 TU reactors.**
- **No dressing required.**
- **Accurate interpretation, without measurement. Averages 250 readings per hour.**
- **Each test is uniform—puncture of 1 mm. depth and needle withdrawal is automatic.**
- **No special skill required.**
- **Painless. Ideal for testing children.**
- **Eliminates hazardous and uncertain flame sterilization.**
- **Disposable needle cartridges ELIMINATE CROSS-INFECTION.**
- **Low cost STERNEEDLE cartridges may be resterilized.**

Note: *CONCENTRATED* TUBERCULIN PPD 'CONNAUGHT' is used for the STERNEEDLE test. Available in 1 cc vials (sufficient for as many as 200 tests).





Procedure for STERNEEDLE TUBERCULIN TEST:

Top, left... Slip needle cartridge on gun with plastic applicator. Remove applicator.

Top, right... Place a drop of tuberculin PPD on cleansed forearm.

Bottom, left... Place gun on drop of tuberculin PPD. Pressure and release of handle automatically triggers and retracts the needles.

Bottom, right: Disposable needle cartridges and applicators may be washed and sterilized for reuse, if desired.

Write for literature. Personal demonstration may be arranged.

TARGET POINT CASE FINDING

THE Panray CORP.

266 South Dean Street, Englewood, New Jersey

Canada: Winley-Morris Co., 4700 Prince of Wales, Montreal

*Trademark. Pat. Pend.

DIFCO

STANDARD METHODS AGAR

Tenth Edition 1953
Eleventh Edition 1960

APPROVED A P H A FORMULA		BACTO PLATE COUNT AGAR	
Pancreatic digest of casein	5 g.	*Bacto - Tryptone (PANCREATIC DIGEST OF CASEIN USP)	5 g.
Yeast extract	2.5 g.	Bacto - Yeast Extract	2.5 g.
Glucose	1 g.	Bacto - Dextrose (GLUCOSE)	1 g.
Agar, bacteriological grade	15 g.	Bacto - Agar	15 g.
Reaction pH 7.0		Reaction pH 7.0	

*BACTO — TRYPTONE, Pancreatic Digest Casein U S P, has been an A P H A Standard Methods Peptone since 1923 and a Plate Count Agar Peptone since 1939.

According to specifications and standards of

USP
United States Pharmacopoeia XVI 1960

APHA
Standard Methods for Examination of Dairy Products XI 1960

AOAC
Association of Official Agricultural Chemists IX 1960

Descriptive literature on request

Specify

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